Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone and Sound Waves
PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY. MONADNOCK BLOCK. CHICAGO

VOLUME 63, NUMBER 16
INDEX TO ADVERTISEMENTS, PAGE 56
CLASSIFIED ADVERTISEMENTS, PAGE 55

CHICAGO, OCTOBER 19, 1912

SINGLE COPIES, 10 CENTS
YEARLY, U. S. A., $3; CANADA, $4;
ALL OTHER COUNTRIES, $5

The "Raven Brand" Issu

RAVEN BRAND GUARANTEED SUPPLIES
AUTOMATIC ELECTRIC CO. SUPPLY SALES DEPT.

Announcing Our Second Birthd

We thank all you Independent Companies for your contributions to our success—

Which is due to mutual *Progressiveness.*

On this, our second anniversary, we ave an opportunity of showing you how e have gained the position we occupy.

We supply cords to all but a few of the operating companies who buy enough cords to make them an important item in their purchasing.

So important is this item that we obtained their business *only* after careful comparative tests and price comparisons.

We now have all this business — we have yet to lose our first customer.

Yet, though *everyone* is *satisf* , we have improved our cords.

We have practically doubled the strength of the outer silk braid.

The only reason for this is that we believe in the success of Independent Telephony and want to aid in every way to promote efficiency and economy of operation.

This change has necessitated new machinery and much expense to us.

But remember our prices have not changed.

This is only a sample of our policy.

To show you our good faith and our appreciation of your patronage we are making the offer in the lower right hand corner.

We thank you, who by your careful buying and earnest endorsements, have made our efforts successful. We hope the coming year will be as prosperous for you as the past has been for us.

SUPPLY SALES DEPARTMENT

of the AUTOMATIC ELECTRIC CO.

1001 W. VAN BUREN ST.

CHICAGO

"Raven Brand" Products

Cable Receivers Monitor Sets
Interior Wire
Enameled Wire
Transmitters
Telephone Cords
Switchboard Cords
Condensers
Indestructible Mouthpieces
All forms of Telephone Supplies
Railway Selecters
Despatching Systems

Ohio Sales Agent
SEYMOUR HIRSCH
667 Spitzer Bldg., Toledo, O.

Southern Sales Agent
WESCO SUPPLY CO.
St. Louis, Mo.

This perfected cord of which we speak is placed on sale for the first time during our birthday celebration. To get them into your hands, so you can appreciate the new features, we offer ten of the new silk receiver cords for a dollar. This offer is good until November 1st.

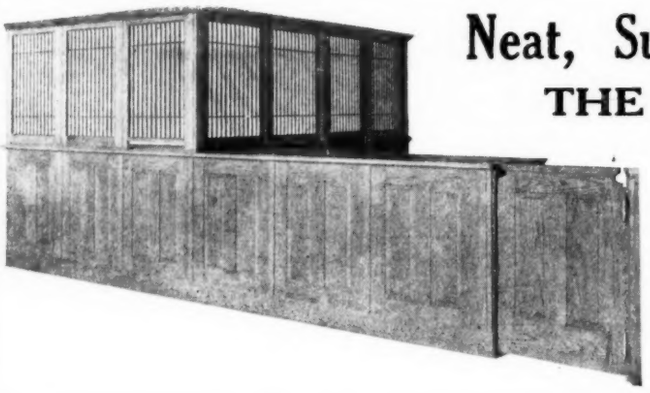
PROGRESSIVE

ALLEN
PRESTO SODER
PASTE STICK

(A Form of ALLEN Sodering Stick)
is a combination of ALLEN-Flux and soder in the correct proportions to produce perfect airtight, waterproof joints. ¶ It does not require an expert to produce the best joints. ¶ A little goes a long way and results are always satisfactory. ¶ Collapsible tube makes it possible to apply where wanted with no waste.

ALLEN
SODERING FLUX

(Paste, Stick, Salts or Liquid.)
All forms produce same high class work. ¶ ALLEN-Flux will do more than any other flux both in quality of joint and in the cost. ¶ If you have never given ALLEN-Flux a trial send us 15c *and your dealer's name* for sample. Specify form you desire.
"Made in Chicago"
L. B. ALLEN CO., Inc.
4578 N. Lincoln St., Chicago, Ill.



Neat, Substantial and Inexpensive
THE BROWNELL SYSTEM
of Interchangeable Unit Office Fixtures

Shipped knocked-down and assembled with a screwdriver. All styles of telephone booths.

Send for Catalog

C. H. BROWNELL
PERU INDIANA

KLEIN TOOLS EST 1857

You can tell a Klein tool by its imprint

Somewhere, usually in plain sight, you will find the old familiar imprint of M. Klein & Sons or, the new trade mark. Any company making a big line of tools like us, must have some means by which their products may be identified. We want the users of Klein tools to know that they are using Klein tools; that our imprint would not have been stamped on our tools unless in our judgment they were thoroughly satisfactory before leaving factory.

Our motto for the past 55 years has been "what we make, we'll make good"—so we let the world know it by stamping our name on every Klein tool.

When you think of a linemen's tool, think of Klein's.

Mathias Klein & Sons
Station U 34
Chicago, Illinois.

THE PEIRCE WALL BRACKET

can not rot, break or split. Backbone of bracket is made of channel section and hot galvanized. Gives you the neatest and most practical construction possible.

THE RESILIENT SPRING THREAD

yields to the irregularities of the insulators and holds them tightly at all times. The spring also takes care of the expansion of metal and eliminates th breakage of glass insulators. Write for more information that will be of value to you.

Peirce Brackets are carried by your jobbers—if not write us

HUBBARD & CO.
PITTSBURGH
NEW YORK CHICAGO

Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves
PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY
MONADNOCK BLOCK, CHICAGO

H. B. McMEAL, President W. H. GRAFFIS, Vice-President F. S. KENFIELD, Vice-President H. D. FARGO, Secretary and Treasurer
H. B. McMEAL, Editor R. H. HOLBROOK, News Editor S. R. EDWARDS, Technical Editor J. C. KELSEY, Financial Editor
J. R. HASTIE, Advertising Mgr. HERBERT GRAFFIS, JR., Asst. Advertising Mgr. W. E. RAYMOND, Subscription Mgr.

Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1897

Volume 63
Number 16

CHICAGO, SATURDAY, OCTOBER 19, 1912

Subscription - 10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

STATEMENT OF TELEPHONY'S OWNERSHIP.

In accordance with the act of congress dated August 24, 1912, requiring publications having second class entry at the postoffice to file a sworn statement showing their ownership and organization, TELEPHONY prints herewith the report giving that information

Statement of the ownership, management, etc., of TELEPHONY, published weekly, at Chicago, required by the Act of August 24, 1912.

Name and Post Office Address—

Editor, H. B. McMeal, 4147 Drexel Boulevard, Chicago.

Managing Editor, R. H. Holbrook, 3921 Rokeby street, Chicago.

Business Manager, H. D. Fargo, 4932 Kenmore avenue, Chicago.

Publisher, Telephony Publishing Co., Monadnock block, Chicago.

Owners: Names and addresses of stockholders holding 1 per cent. or more of total amount of stock:

H. B. McMeal, 4147 Drexel boulevard, Chicago.

H. D. Fargo, 4932 Kenmore avenue, Chicago.

I. B. Lipson, 4947 Vincennes avenue, Chicago.

W. H. Graffis, 945 Galt avenue, Chicago.

E. M. McMeal, 4147 Drexel Boulevard, Chicago.

Known bondholders, mortgagees, and other security holders, holding 1 per cent. or more of the total amount of bonds, mortgages and other securities:

F. S. Kenfield, Augusta, Mich.

E. J. Baker, 410 Diversey Parkway, Chicago.

(Signed) H. B. McMEAL, Editor.

Sworn to and subscribed before me this 7th day of October, 1912.

[SEAL] Grace G. Fraser,
Notary Public.

(My commission expires April 29, 1916.)

Inauguration of a New Constructive Movement.

An event took place in Chicago this week which may mark a new era in the history of Independent telephone operation. This was the organization of the Central States Telephone Service Association, the details of which appear on another page in this issue. The word "Service" in the name should be printed in "black face caps." The dominant idea behind the organization is *service*. It is formed neither for offensive nor defensive measures; those may still be effectively handled in the future, as they have been in the past, by the various state and national bodies of Independents. The new association plans to *serve*.

This service is not to be perfunctory nor spasmodic; it is to be of the highest obtainable character and available at all times to its members. It is planned to bring about among the Independent telephone companies in the central states a uniformity of construction and operating methods which should work wonders in the development of the business. It proposes to substitute for a score or more sets of operating rules one system and one only, of demonstrated merit. It proposes further to extend to its members advice on all questions given by recognized experts in every branch of the business.

Is the wiring of a toll board, or the arrangement of a circuit in question? The Service association will straighten the matter out gratis. Does a question of traffic arise? The traffic committee, when the facts are submitted to it, will study the problem and offer a scientific solution. The commercial committee, in turn, will suggest helpful and tried schemes for stimulating business, handling collections and a hundred other things.

In short, the association proposes to unify the business in a manner never before attempted. If its plans work out it proposes to place the Independent telephone business in the territory to be covered on a footing more solid than ever before; to inaugurate a period of successful operation far ahead of anything hitherto known.

It is admitted, for example, that the multiplicity of toll and long distance methods and codes—or their entire lack—con-

stitutes a considerable handicap to the rapid and profitable interchange of business between the various companies connecting with one another. The adoption of a standard system of operation and a universal code would remedy this at once.

Many smaller companies are unable to afford the luxury of skilled engineering counsel. As a consequence they make mistakes in laying out their systems, or in planning and executing extensions and betterments. The Service association will remedy this by giving them free advice of the best grade to be had, thereby saving them money in appreciable amounts.

Savings effected in operation mean more money for stockholders, for maintenance, for new construction, for depreciation reserve.

In return for these and many other benefits it asks of its members only real co-operation in the adoption and enforcement of its plans for uniform service, and a nominal sum yearly to indicate seriousness of purpose. This seems a small return for so many advantages.

The whole plan is unique. It has never, to our knowledge, been tried before. Its success depends wholly upon the character of the support which it elicits from the field. If successful, it should prove a big help to the established Independent telephone associations, state and national, with which it is planed to co-operate to the fullest extent. It undoubtedly merits at least thoughtful consideration of every Independent operator. Any of the officers, or members of the executive committee, will give further details if called on for them. TELEPHONY will report progress as it is made from time to time.

Why not get acquainted with the new movement and file your application for membership at once? Make it a point to attend the next meeting, whether you are formally invited or not. You will be made welcome and you may learn something worth knowing. Constructive work of a high order is being undertaken. Have a hand in perfecting it!

Perseverance is a grand quality. Set your mark and stick to it. That is the way the big fellows win out.

The Need for Men of Conviction.

In a paper recently read at a meeting of telephone men, F. L. Devereaux, auditor for the American Telephone & Telegraph Co., quoted the president of a big New England railroad, as follows:

"One of the greatest difficulties I have is to make subordinates feel that I want them to give their work their best individuality and effort and not try constantly to find out what I want. If a subordinate has a proposition to present to me I want him to stand up man fashion and defend his proposition, not because it pleases me, but because he believes in his proposition. Nine times out of ten the men are trying to find out what the superior wants instead of asserting their own individual views.

What the business needs is men with individuality, industry and sufficient initiative to originate and execute the things which they believe will advance the interest of the company. It is this spirit that will make our system more efficient and not the spirit so prevalent among some of our organization men whose chief effort seems to be to increase their pay.

Take the hundreds of men engaged in business who have secured a competency—I mean a fair living competency; after these men secure that competency, the greatest reward that can come to them if they are built right is to want to be able to do the thing they are called upon to do better than they have been doing it, and if possible better than anyone else in the business is doing it. That is the spirit I wish to see introduced into our business."

Mr. Devereaux added: "Potential geniuses exist in large numbers, but fail of discovery because they are not developed. If we wish to develop the men around us we must inculcate a real love of the business. One of the best ways is to allow a man to assume responsibility, to assert his personal initiative, to make a man believe that he is creating something and that he is expressing himself in his work. Then one must make the man appreciate that his work is important and useful."

Efficiency in Traffic Work.

In these days there are few organizations which have not been subjected to close scrutiny in an effort to obtain better results and to increase the efficiency of the force as a whole. The various departments of telephone companies have been placed under the efficiency microscope and many were the weak spots found. This resulted in improved methods being used and new appliances tried out both by the inside and outside departments.

In the telephone traffic business, it is recognized that the public will respond readily and quickly to an increased efficiency in handling calls. It is said that by a change in method of handling toll calls between two points, one company reduced the time of completing connections from about three minutes to about 80 seconds or about 55 per cent. The toll rate was based upon an initial period of three minutes and this was lengthened to five minutes. The result of these improvements was an increase of over 80 per cent. in the use of the circuit in the two months immediately after the changes were inaugurated. Practically all of this increased traffic was due to the improvement in the service resulting from the change to new methods.

This is but one instance of what may be accomplished in traffic work through a study of efficiency. On another page some interesting ideas, bearing on this subject are presented in the article by Mr. Wayne. He shows that the study of efficiency depends upon an analysis of costs as the first step, with a proper proportion of the cost assigned to each part. As a foundation, a fundamental work unit is adopted so that every duty of an operator may be expressed in multiples and fractions of the unit. From this the cost for local and toll traffic will probably be expressed in cost per work unit.

The costs fundamentally depend upon the appliances and the worker and these may be more specifically divided into appliances, average cost per employe hour and output per employe hour. An analysis of these three divisions indicates that the quickest results in efficiency may be secured from a study of the third item, i. e., "useful work per employe hour." In his paper Mr. Wayne mentions many of the factors which enter into or have bearing upon the useful work or output of the employe. Consideration has been given some of these factors by various telephone companies and others are being studied and changes made as analysis reveals that they would be conducive to the greater efficiency.

Central States Telephone Service Association Formed

Informal Meeting in Chicago of Telephone Operators From Illinois and Adjoining States Results in Organization Designed to Promote GoodService and Co-Operation in Wide Territory— Important Committees Appointed for Constructive Work

The Central States Telephone Service Association, an organization with the declared purpose of "promoting harmony and co-operation between the various Independent telephone companies in the central states, with a view of improving commercial, traffic and plant conditions, promoting standardization and uniformity of methods, and perfecting service," was organized on Wednesday, in Chicago.

The plan of the association was evolved and carried out at an informal meeting at the La Salle Hotel of operating telephone men of Illinois and adjoining states, called at the instance of the Illinois (Independent) Telephone & Telegraph Co., of Chicago, for the purpose of a general discussion of telephone service in and out of Chicago and means of perfecting it. The meeting which lasted the entire day, was quite largely attended and was thoroughly representative.

The informal discussion of present conditions gradually and naturally swung around to a consideration of the best methods to adopt to secure perfect service to and from all points in the central states. Out of this a plan was formed which, it is believed, will go far to secure uniform operating rules and, to a large extent, uniform equipment for the future. The ultimate result was the forming of an organization which is designed to ultimately include every Independent company in the central states—an organization which will co-operate with existing associations, district, state and national, and which will materially strengthen them.

One of the most important accomplishments was the appointment of three committees to be known as service consulting committees. The chairmen are men of recognized ability in the three lines from which the committees derive their names—plant, traffic and commercial. These committees are to be at the service of members desiring exact and specific information regarding the three branches of operating named. That is, they will give expert advice along these lines and will give it gratis, where the matter does not involve extensive and elaborate analyses and investigations. Questions such as arise almost every day in the conduct of the average plant, whether large or small, will be handled by the committees on behalf of the members, and without charge. The committees will merely recommend such procedure as seems best, but will have no authority to enforce their suggestions.

B. G. Groh, chief engineer of the Illinois Telephone & Telegraph Co., is chairman of the plant committee; W. S. Vivian, secretary of the Michigan Independent Telephone & Traffic Association, Grand Rapids, Mich.. is chairman of the traffic committee; C. L. Fisher, of Pontiac, Ill., is chairman of the commercial committee. All are recognized specialists in their respective lines and they will each be backed by a strong committee, the members of which will shortly be named.

Another important committee which was appointed and which will at once organize for active work is that which will take up the preparation of operating rules for general application throughout the territory to be covered by the activities of the new association. These will be largely modeled upon the rules adopted by the Michigan Independent Telephone & Traffic Association (recently printed in TELEPHONY), which are conceded to be the most comprehensive and practical now in use.

The members of this committee, which has not yet selected its chairman, are: W. S. Vivian, Grand Rapids, Mich.; H. B. Gilmore, Springfield, Ill.; H. D. Stroud, Chicago; C. E. Tarte, Grand Rapids, Mich.; F. L. Eldridge, Chicago; E. E. Dacey, South Bend, Ind.; L. C. Griffitts, Aurora, Ill.; J. C. Casey, St. Louis, Mo.; and W. S. Fisher, Kankakee, Ill. These are all practical operating telephone men and it is safe to conclude that their conclusions will be sound and feasible for general application The smaller company, in particular, is to receive consideration in their deliberations.

J. W. Callahan, general manager of the Illinois Telephone & Telegraph Co., presided at the meeting Wednesday. The sense of the meeting in favor of a permanent organization becoming apparent, upon motion Mr. Callahan appointed S. W. Tracey, vice-president of the Chicago Independent company; W. S. Vivian and E. E. Dacey, a committee on organization. After deliberation the committee brought in its report, which outlined the basis of the association, as below:

NAME: The name of this organization shall be the Central States Telephone Service Association.

OBJECT: The object of the association shall be to promote harmony and co-operation between the various Independent telephone companies in the central states with a view of improving commercial, traffic and plant conditions, promoting standardization and uniformity of methods, and perfecting service.

MEMBERSHIP: Any operating telephone company may become a member of this association upon filing application with the executive committee and receiving said committee's approval.

OFFICERS: The officers shall consist of a president, a vice-president and a secretary and treasurer who shall be elected for a period of one year and shall serve until their successors are elected and qualified.

DUTIES: The duties of the officers shall be similar to those of such officers in similar organizations.

EXECUTIVE COMMITTEE: There shall be an executive committee which shall consist of nine members of which the officers shall be members ex officio, which shall be elected at the annual meeting.

COMMITTEES: The standing committees shall be: commercial, traffic and plant, which shall be appointed by the president and shall consist of three members each.

MEETINGS: The annual meeting shall be held on the fourth Wednesday in October of each year, at Chicago. Other meetings shall be called from time to time as may seem advisable by the president, or upon the request of any three members of said executive committee.

DUES: The dues of this association shall be one cent per unit (a unit being one subscriber or a circuit mile of toll line), same to be paid in within thirty days of receipt of call for all or any part of same from executive committee.

AMENDMENTS: Any article or articles of this constitution may be changed at any regular meeting of this association upon receiving a two-thirds majority vote, or at any special meeting, providing written notice stating the proposed changes is given to the members two weeks in advance of such special meeting.

This report was unanimously adopted, after which the association proceeded to the election of officers, resulting as follows: President, J. W. Callahan; vice-president, C. E. Tarte; secretary and treasurer, L. J. Wiley, of Decatur, Ill. The executive committee consists of the foregoing and E. E. Dacey, L. C. Griffitts, W. S. Vivian, W. S. Fisher, H. B. Gilmore and Mr. Ainsworth, of Bloomington, Ill.

A charter will be applied for at once and the organization legally completed. It is expected that an early meeting will be called for further discussion at which time it is expected that the membership will be largely extended.

With a view to making the plans of the association better

and more widely known, it was unanimously voted that the officers of the Illinois Independent Telephone Association be urged to call the annual meeting of that body in the near future, and that the members of the Central Telephone Service Association be permitted to participate in the convention, to the benefit of both organizations.

Copper Stocks Increase Over 16,000,000 Pounds.

The monthly statement of the Copper Producers' Association, giving the production and consumption of copper in the United States in September, as compared with August last and September, 1911, shows an increase over August of 16,364,213 pounds. The comparative figures are as follows:

	Sept. '12	Aug. '12	Sept. '11
Stocks previous month	46,701,374	50,280,421	133,441,501
Production	140,089,819	145,628,521	115,588,950
Total	186,791,193	195,908,942	249,030,451
Domestic deliveries	63,460,810	78,722,418	57,311,584
Exports	60,264,796	70,485,150	50,824,011
Total	123,725,606	149,207,568	108,135,595
Stocks remaining	63,065,587	46,701,374	140,894,856

While an increase in marketable stocks of copper was expected to be revealed by the September statement of the Copper Producers' Association, it was not expected that the accumulation would be so large. This was due entirely to the falling off in deliveries to domestic consumers of about 15,000,000 lbs. as compared with those made in August.

While producers are at a loss to fully explain the smaller domestic consumption, it was thought probable that some of the producers anticipated shipments of October copper in August. This would account for the record-breaking home deliveries in that month and would also account in a measure for the falling off in September.

The exports to Europe were about as indicated by the United States Custom House returns. Production continued at the top notch, the average daily output in September showing very little change from the daily average production in August.

The Joint Use of Poles.

At the annual convention of the American Electric Railway Association held in Chicago last week the need for a standard form of agreement for joint use of poles was pointed out in a committee report.

There was considerable discussion on the question of the joint use of poles. William Roberts declared that the prime factor to be considered was the safety of linemen. There should be a clear space of 15 in. on each side of the pole, making an opening of 30 in. between wires for the lineman to climb through. Professor Richey said the railway men took the position that vertical attachments, like transformers, should be on the "face" of the pole, leaving the "back" free for climbing through the 30-in. space.

Telephone cables should not be attached to the pole by a bracket in the case of joint use, but suspended from a cross-arm like all other wires and cables. Apparently the railway and electric light men are in agreement on this subject, but telephone men are inclined to object to cross arm suspension of telephone cables.

New England Bell Bond Issue.

Kidder, Peabody & Co., of Boston, have purchased $10,000,000 20-year 5 per cent. debenture bonds of the New England Telephone & Telegraph Co. and will make public offer of the issue soon.

Enterprise at Naval Meet in New York.

The New York Telephone Co., alive to a first-class opportunity, has established a system of telephone connections near the various ships of the enormous fleet which are now anchored along New York City's water front. Display advertisements in the local daily papers give details of how to reach the men on the ships, together with a complete list of the vessels and the telephone number to call for each. The general plan is outlined as follows:

"While the fleet is in the North River, the New York Telephone Co. will maintain public telephone stations in charge of competent attendants, at the various landings along the water-front.

Telephone messages for those aboard any of the ships listed below may be sent from any telephone to these stations. The answering telephone attendant will write the message down, place it in an envelope and, by arrangement with the naval authorities, turn it over for delivery to the next boat leaving the landing for the ship you desire to reach.

Telephone stations will be open from 8:00 a. m. until midnight. Below will be found an alphabetical list of the ships and opposite each the telephone number to be called."

This is as an indication of the ease with which a company may popularize itself, particularly when anything of an unusual character is afoot. There can be only one such naval display, but there are thousands of lesser public happenings which offer opportunities for similar alertness—and its consequent advertising.

Inter-State Has a Fire at Peoria.

What promised to be a serious fire occurred recently in the switchboard room of the Inter-State Independent Telephone & Telegraph Company's exchange at Peoria, Ill. Fortunately the fire was extinguished before the switchboard was destroyed. By dint of great exertion, E. T. Teece, local manager, had almost entirely restored service within a few hours. H. B. Crandall, chief engineer, also hurried to the scene and aided in the work.

Outlines Plan for Cleveland Municipal System.

Allen C. Morse, former chief engineer of the Cuyahoga Telephone Co., of Cleveland, Ohio, and now a consulting electrical engineer, has outlined to Mayor Baker and Public Service Director Springborn a plan under which he believes the city of Cleveland could establish an independent municipal telephone system at a total cost of $6,500,000.

This expenditure would care for 65,000 subscribers, or about the total number of subscribers of both the Bell and Cuyahoga companies.

Mr. Morse advises emphatically against the purchase of the equipment of either company. He declares that if the city enters the telephone field by buying out either the Bell or Cuyahoga or both, it will not be in a position to lower telephone rates.

Telephone Induction Cases in California.

The California Railroad Commission set October 16 for the hearing of the induction cases, which have arisen upon the complaints of the Pacific Telephone & Telegraph Co. against power companies of California. In these the charge is made that the proximity of the high tension power lines to the telephone wires renders the latter non-commercial.

The telephone company has stated in its complaints that the resultant induction is of such a nature as to make large sections of its line practically useless for telephone purposes. It has requested the commission to compel the power companies to move their high tension wires from 700 feet to 2,000 feet from the telephone lines.

The commission has inaugurated an investigation into the whole situation, through the agency of its engineering and service departments.

Determination of "Going Value" of a Public Utility

A Consideration of Various Methods of Fixing the Value of Intangible Assets of a Utility—"Good Will," "Franchise Value," Etc.—An Article Contributed by the President of the Pennsylvania Water Works Association to Public Service, Chicago

By Morris Knowles, C. E.

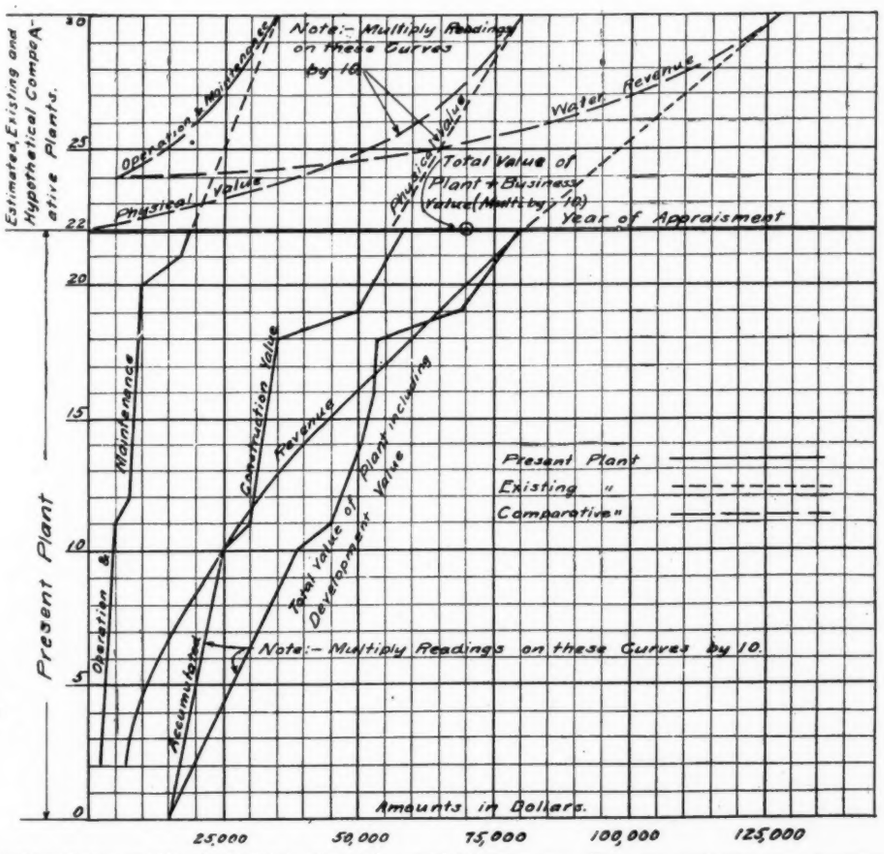
This subject is exceedingly complex and thorough study reveals a great diversity of opinion. The object of this article is to present the trend of modern thought, to show how opinions have been modified by the recent idea of regulation; and to suggest some principles as a guide in determining this value. In addition to the actual physical value of a utility property there is an intangible item, designated by various names and determined by different methods, which has been generally recognized and included in the present worth. This item in some of the most recent discussions has been called "going value" or "business value." It will be understood to mean and include, so far as applicable, such phrases as "good will," "franchise value," "development value," and other like items.

In certain lines of trade, this feature of value has been referred to as "good will" and estimated by the experience of men acquainted with the particular business under discussion. "Good will," with the correct use of the expression, is an item of value existing only in a competitive concern. It represents that value of an establishment which is due to the patronage of habitual users and to the probability that present customers will resort to old places. The term "good will" is not strictly applicable in the consideration of a non-competitive public utility, where there is no choice of patronage. This fact has been established by several decisions of the courts.

In some cases the amount of the intangible item has been included under the heading "Franchise Value." While no exact method of determining this value has been given, it may be generally stated to be the difference between the total value and the cost of the physical works. "Franchise value," in a true sense—i. e., "value of the franchise"—is not the same as "going value"; for it is the worth of the right, if there be such, to operate as a public utility. In other words, it is the value of the right to do business and is given to the corporation by the people through their legislature. The latter frequently, but not always, reserves the power to withdraw this right under certain stipulated conditions.

It is very doubtful if there is any value, under the strict definition of the phrase, to a right received from the people without some compensation. That this is true is apparent from the reasoning of some of the older decisions granting such allowance, and it is evident that the tendency is to deny that the "right to do business" has such a value. Such a right, even if not fully revocable, has been directly made so by the recent conclusions as to the wisdom of regulating the rates and the charges of public utilities. It is within a comparatively few years that the public has awakened to a consideration of the charges made by public service corporations. The scope of the regulation of rates has been increased, and courts and commissions empowered to more fully investigate such charges and to outline a proper basis for their determination. As a result, there has arisen the necessity of arriving at a correct designation for the item of intangible value and to determine a proper method of estimating its amount. The existence of some such item has not been questioned, and it is recognized by the tribunals throughout the country, as is shown by numerous decisions.

The term "business value" has been variously defined,



Relation Between Physical Value, Operation and Maintenance Expense and Revenue in Present plant and in the Hypothetical Existing and Comparative Plants.

but the three main ideas are as follows:

(1) The earning power of a corporation, due to the fact that it is a paying concern;

(2) The value of the deficits incurred in the formative period of the existence;

(3) The value that the corporation has, due to the fact that connections are made and service is in use, while another would have to make all this preparation.

There are three ways of arriving at a going or business value, which have either been recognized by courts or utility commissions, or advanced by engineers and appraisers. It will be seen that each method of calculation corresponds closely to one of the three definitions. These methods of calculations are:

1. By capitalizing net earnings:
2. By securing the value of the deficits during the period of development;
3. By comparison of the earnings of the present plant with those estimated for a hypothetical comparative plant, during a supposed development period.

For a number of reasons capitalization of net earnings has not been approved within recent years. Earnings depend on the rates. Thus fluctuations in the latter affect the earnings and those which are based on such rates can be no fairer than the rates themselves. In other words, to regulate rates by such method of valuation is reasoning around in a circle and no intelligent result can be obtained.

It is probable that a public utility will not, in the early days of its existence, meet the expenses of operation, maintenance, depreciation and interest and still pay a reasonable return upon the investment. Capital can, therefore, be attracted only when the future offers prospects of sufficient growth to place the company upon a paying basis. It is a case of gradually developing the businesss to the extent of being able to meet all charges, including a proper return upon the investment.

This method has been adversely criticised, because it deals with the original cost and not the reproduction cost of developing the present works. Such criticism may be warranted, when the interests of the purchaser alone are considered. In case of a taking, it has been generally held that the reproduction cost shall be the basis of the valuation. It hardly seems equitable, however, that the interests of the new investor alone should be regarded in such a compulsory bargain, for there are circumstances in which the property has rightly cost considerably more than will be shown by the reproduction method. Some of the later decisions have recognized that original cost and book costs are proper elements to consider in a taking and especially in a rate-making.

Various Methods of Computation.

The second method has been further criticised because such expense, i. e., the value, is influenced by the character of the management. Thus, careless administration, either in the operation or in the building of the system, would increase the deficits in the formative period. This is very true, but it seems that it can be provided against by a careful review of the items of expenditure. If the expenditures do not compare favorably with those which are deemed reasonable from experience with similar plants, they can be altered to make them so. It is not right, however, to substitute our hindsight for fallible foresight, in considing the propriety of such early outlays.

This method is applicable in cases where the rates are equitable and where a purchase is the object, rather than where a determination of the valuation for the purpose of fixing rates is desired. In the case of the latter purpose, it seems that this method is subject to the same criticism as the first one mentioned, that of capitalization of present earnings. For the use of the present earnings as a basis in estimating the growth of a hypothetical plant and then arriving at the difference between the revenue from this and from the existing plant, seems to suggest the same objection of reasoning in a circle.

Reproduction Cost Alone Not Fair.

There are so many assumptions to be made in the application of this theory that there is a possibility of great disagreement between appraisers. From the standpoint of a buyer who is willing to pay more and avoid the trouble of building up a business, the method seems quite applicable; but, from the standpoint of the man who is selling the property, the reason for its use does not seem so clear.

It is probable that the use of this method and its more recent promotion has been in response to the argument that the valuation for a taking and a rate regulation should be based upon cost of reproduction; thus that "going value" should be based upon the cost of reproduction of the created income. But, as herein pointed out, the reproduction cost does not always represent all of the proper cost, either of physical items or of intangible element.

The application of this method involves the comparison of the plant under discussion with other known plants, in order to establish the rate of growth and income to be expected. These must always be made carefully and they will vary with the experiences of different men; the development which seems necessary in one case will not be required in another.

The accompanying diagram has been prepared to illustrate the determination of "going value" by the method of early deficits and by the comparative re-production method. The history of the plant is graphically illustrated by the diagram which shows the growth in physical value, operation and maintenance charges and revenue throughout a period of 30 years. The data for the first 22 years is employed to determine the development value by the deficit method, while that for the remaining period is used in the comparative reproduction method.

Referring to the diagram, at the end of the twenty-second year it becomes necessary to determine the value of the utility, including the physical works, and to estimate the development value. First must be determined the amounts of money expended yearly for construction or new work. The accumulation of these yearly expenditures will give the book value of the plant at the end of any year. Next there must be known the expense each year, including operation, maintenance, depreciation and an amount which will represent interest and earnings to which the property is entitled and which as used is 8 per cent.

Deficits Regarded as Money Invested.

The sum of these amounts will represent what an owner should have received. The difference between what it should have received, and what it did receive equals the amount that the plant did not earn, and these accumulated deficits are treated as so much money invested in the business, upon which the owner should earn a proper return. They are, therefore, added to the cost of construction or new work and give the value of the property for each year.

The diagram presents, in suitable lines, each of the three factors necessary for computing the value by the deficit method, and there is also given a curve representing this value as determined. The physical value is $582,000; the total value is $794,200, the development value, therefore,

being $212,200. In the example given, had the allowances for replacements been added and deferred depreciation been subtracted, the net amount, being the development value, would be $149,000, which is the proper amount.

By this method, the subject of "going value" is approached from the standpoint of the investor or purchaser, rather than from that of the owner or seller. Its object is to determine how much more than the reproduction value of the physical plant the seeking investor can afford to pay the willing seller because of immediate return which would be obtained from the existing works.

A comparison is made between the expected net income from the existing plant and that estimated from a hypothetical comparative plant which will, at the end of an assumed development period, have the same physical value, income, operation and maintenance expense and the same earning capacity as that of the existing plant at that time. The values used in this comparison are shown upon the diagram.

The method of making this determination is much similar to that used in method two, except that loss or earnings are ascertained for both a hypothetical plant and the existing plant and the algebraic sum of these amounts is discounted back to the present worth. The business value by this method would be $115,000.

The review of the subject is thus summarized:

1. There is some item of value to a public utility, over and above the bare physical cost or value of the works.

2. The former terms of "good will" and "franchise value," are now or should be obsolete for the application in mind. The former because there is no good will to a monopoly; the latter because, as strictly interpreted, there can be no value to that which the sovereign power, the people, have given for nothing, and especially in this day of public enlightenment, when rates and charges are more and more becoming the subject of review.

3. For lack of a better term today, we are using the phrase "going value" as representing this intangible item. It is probable that a finer distinction, which may be recognized in the future, will be to name this "development expense," in the case of a forced sale, taking or rate making, and "business value" in the case of a purchase by an investor, or a willing sale.

4. While such item of value is recognized, the methods and details of determination have not yet been passed upon by the highest court. Generally the decisions have reviewed the discussions of methods without expressing opinions and have accepted a value somewhere near the average. Some of the western decisions seem to indicate an approach to the recognition of the theory of "development expense."

5. The "development expense," as determined by the deficit method, has been most clearly outlined by the Wisconsin Railroad Commission and has the advantage of such clear, intelligent discussion and the weight of such authority not yet reversed.

6. The "going value," by the comparative reproduction method is particularly applicable for a harmonious purchase and well represents all a careful investor could afford to pay for a property. It may be the only method that can be used, with various adaptations, in case the early financial history of the works is unknown, or in case the court ruling compels strict adherence to a reproduction cost, less depreciation, as the basis of physical value.

7. This increment of value will generally be larger when determined as a "development expense," than if estimated by the comparative method; unless there has already been opportunity to recoup early losses.

8. It is suggested that, for the purpose of a taking or rate making (most cases come under those two headings), the fairest method is to consider such item as a "development expense," to be determined by the accumulation of deficits during a reasonable period, below a fair return on the investment. If the records and financial history are not sufficiently complete, then recourse must be had to a comparative reproduction method or to some modification of the other.

In using the deficit method, careful scrutiny of the financial records must be made, in order to eliminate improper or unjust charges; always tempering present exercise of judgment with a realization of the usual failures of early planning.

Indiana Company Records Good Growth.

Stockholders of the Farmers Mutual Telephone Co. of Whitley County, with headquarters in Columbia City, Ind., held their annual meeting recently in that city. The reports submitted at the meeting showed receipts of $18,354; operating expenses of $5,870 and a net cash balance on hand of $972.

During the past year there was spent from earnings $6,216 for maintenance and $3,632 for new construction, with miscellaneous expenditures of $2,922. Bills receivable at the end of the fiscal year aggregated $7,874; bills payable amounted to $3,410.

The company, which began operations in March, 1904, with but a few telephones installed, now has 1,675 stations, 260 miles of pole line and 1,200 miles of wire. The actual cost per telephone is placed at about $45. Since its organization the company has applied $32,613 from earnings to extensions and betterments. The original investment was $50,840.

Directors for the ensuing year were elected as follows: L. J. Keiser, Thomas A. Jellison, E. E. Rindfusz, Jesse Miller, W. H. Carter, Melvin Blain, Isaac Humbarger, J. W. Kauffman, Albert Bush and I. J. Krider. The officers, who were re-elected, are: President, Albert Bush; secretary, Melvin Blain; treasurer, W. H. Carter; assistant secretary and general manager, R. R. Scott; superintendent of construction and wire chief, Marvin Scott.

New Trans-Bay Cable at San Francisco.

The Pacific Telephone & Telegraph Co. has been granted permission to lay a new telephone cable across the bay. It is said that the cable will be one of the largest in the world. It is being laid in anticipation of greatly increased business, following the establishment of lower rates to the trans-bay cities.

Since the company reduced its rate on September 1 from 15 to 10 cents, the number of daily calls has increased 9 per cent. Previously, the average number of calls per day was 9,096, these including calls between Oakland, Alameda and San Francisco. For the first twelve days of September, the average per day was 9,840 calls. Under the old rate, the company's gross revenue daily from the transbay service has $1,364.40. The average gross revenue per day since the new rates were put in is $984, or a decrease of $380.40.

An Impressive Long Distance Stimulant.

The Federal Telephone & Telegraph Co., of Buffalo, N. Y., is distributing among its subscribers a folder bearing a map of the long distance range of the company. The map is here reproduced. The arguments which accompany it are, in part, as follows:

"The trade areas of western New York are more sharply defined and limited by geographical boundaries than any other district in this country of similar size.

Fully 90 per cent. of the volume of business originating in this district is transacted wholly within these boundary lines.

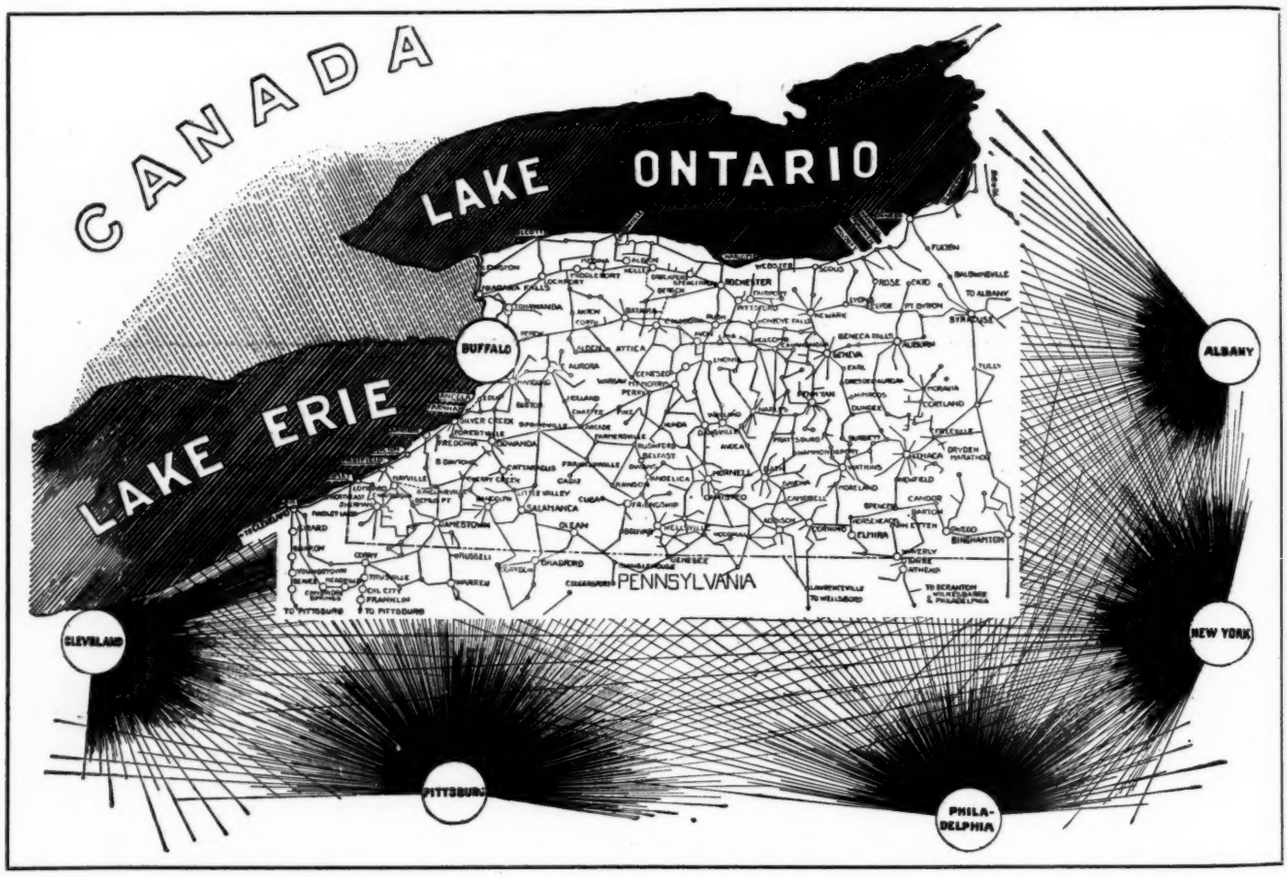
The Federal Telephone & Telegraph Co.'s long distance

lines reach all points within this district of western New York, connecting in the neighborhood of 110,000 telephones and furnishing the telephone requirements for fully 500,000 people.

The Federal company specializes the telephone business in this district. It has no interests in other fields. The undivided effort and attention of its officers and employes is given to furnishing an efficient and comprehensive service within this district, which is proving highly satisfactory and sufficient for the requirements of its subscribers and patrons and the telephone-talking public of Western New York.

The business man of western New York is generally and naturally restricted in his trade territory by Lake Ontario on the north; Lake Erie and Canada on the west, and the radiating lines of trade from Cleveland; the sparsely settled mountainous regions of northern Pennsylvania on the

Town	Population	Federal and Associated Co.'s
Buffalo	423,715	22,000
Rochester	218,149	15,000
Jamestown	31,297	3,200
Hornell	13,617	1,563
Salamanca	5,792	567
Friendship	1,218	317
Corning	13,730	1,337
Pen Yan	4,597	1,300
Canisteo	2,259	400
Franklinville	1,568	267
North Collins	1,200	370
Silver Creek	2,512	724
Waverly, Athens, Pa., and Sayre, Pa.	13,894	1,979
Geneva	12,446	1,906



Map Showing Long Distance Lines and Connections of Federal Telephone & Telegraph Co., of Buffalo, N. Y.

south, and the radiating lines of trade from Pittsburgh and Philadelphia; and on the east of Syracuse and Binghamton by geographical conditions which take the trade naturally toward Albany and New York.

The Federal Telephone & Telegraph Company's long distance lines reach all points within this distance of western New York, connecting in the neighborhood of 110,000 telephones and furnishing the telephone requirements for fully 500,000 people.

It is these people, more than any other class, that the business man of this western New York district seeks out as his customers, because they live in the districts which are naturally tributary and easily accessible from his district and where other trade centers are at a disadvantage in reaching them.

The names and addresses of these prospective customers are at his command through reference to Federal telephone directories, and their ear is easily reached for a trade solicitation over Federal local or long distance lines.

As an illustration of the extreme use of the service of the Federal Telephone & Telegraph Co. and its associated interests we give below the population of some towns in western New York, with the numbers of Federal telephones, or associated telephones, in use in each place."

Wellsville	4,382	752
Watkins	2,817	698
Ithaca	14,802	2,185
Clifton Springs	1,600	265
Rushford	600	248
Cherry Creek	634	136
Gowanda	2,800	564
Le Roy	3,771	771
Springville	2,246	727
Bath	3,384	434
Dansville	3,938	644
Niagara Falls	30,445	2,106
Dunkirk	17,221	1,121
Prattsburg	694	282
Avoca	1,026	267
Wayland	1,220	298

This is a thoughtful presentation of the merits of the Federal service, which is most impressive. The folder should produce results of a most satisfactory nature.

The comparative figures shown in the table offer a strong argument to use the Independent service generally, in place of the more restricted service of the Bell company.

We—The People

Municipal Telephones—Misguided Efforts, Etc.

By J. C. Kelsey

As I came down to work this morning, I noticed for the first time some very handsome political posters. One poster in particular interested me. Underneath the picture of the aspiring candidate was the following legend: "Who cut your telephone bills?"

Upon that slender thread of human achievement, a candidate is seeking favor with Chicago voters. But it reminded me of a thought I have always had, that the telephone has been marked, or "born to hang," as the saying is.

Does it not strike you queerly that no candidate has ever run for office because he reduced the price of groceries or meat or fuel or clothing? Queer indeed it is that with so many useful and very concrete opportunities to serve the people, no candidate has ever availed himself!

There is nothing spectacular about fighting for meat and potatoes. But a foreign-owned telephone company does make a juicy prize.

The question of meat and other necessities involves a thousand dollars where it touches one of the telephone. But no one is interested in necessities. Only luxuries satisfy us.

I knew a woman who felt guilty at spending $15 for grand opera. So she sent the money to a sister in poorer circumstances. The poor sister did not spend it on meat, potatoes and bread. She was soulfully sighing for grand opera, and she spent the $15 for that purpose.

I suppose, for this very reason, no self-respecting politician would interest himself in actual necessities.

We have heard a great deal about the French princess advising the starving people to eat cake because the bread was gone. The child was merely human.

Why should they be interested in bread? She, herself, did not like it, and undoubtedly was forced to eat it.

If the same effort were made to cut down household bills, and it was done in the same proportion, we would have something to brag about.

Every man, woman and child is interested in the reduction of the price of necessities.

Nearly two and one-half million! And I venture to say that there are not 10,000 people who were benefited by the telephone reductions. And that reduction did not affect the household more than 50 cents a month or $6 per year.

This telephone business is a queer one. It is different from any other industry. People spend more money fooling over a telephone than they pay for the service.

I once attended a meeting of farmers. They came from far and wide to talk over a telephone matter which involved an increase of $6 per year for telephone service. There had been at least a half-dozen other meetings. Men came in automobiles, on horseback and some drove two horses.

To discuss a question involving $6, cost each man much more than that.

So I have come to the conclusion that the farmer is not in the telephone business from an economic standpoint, but from the terrible fascination of the game.

Surely a farmer would not spend $25 a year on team wear and time or gasoline, merely to give his farm a telephone for $6.

Coming back to the city man, he has no time or opportunity to run a telephone company. So the politician uses him for a weapon.

With dozens of things that a real politician could do, he merely chooses the telephone and goes to work fighting the burdens of the people. No other business offers so many inducements for attack.

As I read the papers, I can see the signs.

Cleveland is talking a municipal plant.

Sioux City voted strong to keep two telephone systems in competition.

Albany and Syracuse are quarreling over the rates imposed by the telephone company.

Davenport, Moline and Rock Island want two companies.

Jacksonville people voted for another telephone system.

Des Moines is getting ready to vote upon the question. I know in my own heart that it will carry.

Now for years the Bell company has carried on a publicity campaign against Independent telephone stocks and bonds.

I do not blame them for protecting their own business as they saw fit. And they have succeeded in giving 98 bankers and investment dealers out of every 100, the impression that the telephone is bad except under the blessing of a natural monopoly.

What is the meaning of this action on the part of cities?

What will follow this seeming discontent, this willingness on the part of the people to rally to any real or imaginary crisis?

Here is exactly what will happen:

If it is so arranged that none of these franchises or gifts of the people can be financed in the regular way, the outcome will be that the cities themselves will do it.

The money powers, after cutting off all resources to private competing enterprise, will find themselves face to face with the same fight on municipal securities.

The same spirit which interests a farmer to the point of exposing life and health, and killing his horses on stormy nights, or puncturing tires on the way to a telephone meeting, exists in the cities, only in a different and vastly more formidable extent.

If the promoters of the newly granted franchises are unable to finance their enterprises, the next inevitable step is for the same forces to compel public opinion to vote for municipal fiancing. And public opinion is such a weak and unstable thing that no one can for one moment think that the promoter and politician can fail to do it.

I read the other day in a financial paper, that the people are not inclined to vote for municipal telephone systems.

Who can say that authoritatively?

We won't know this fact until they vote and the last vote is counted.

Who are the people who vote?

Not the ones that the financial editor meets, nor ones that a big official meets socially.

In the Sioux City vote, the merger people took every

precaution to win. And the conditions were so favorable that the mergerites sat back and celebrated the victory.

But there was no victory. It was a bitter defeat.

It's just like a college man's political league.

I know personally of one place where there are 600 voters, and only ten of them guilty of college training.

It is vastly probable that a vote upon municipal telephones would result, 590 for; with 10 against.

The people who give the real decisions on all public questions do not even read the papers. The real judges of the desirability of municipal telephone service are those who neither pay taxes or use the telephone. And they are the very ones who will stand with awe before a campaign poster of the man who reduced somebody's telephone bill.

The whole world is like a small boy. It takes very little to please a child and make yourself out a hero in his eyes.

Why, I worship a man to this day, the man who gave me a quarter baseball over thirty years ago. And you will admit of the same experience, too.

It takes very little to lead a child away from his homeward path. The famous Charley Ross was lured to his terrible disappearance with a bag of cheap candy.

The public is very little removed from the irresponsibility of small children. That is why no financial paper or any other institution can predict what the public wants.

Every dollar of advertising for the purpose of moulding public opinion is wasted. Every day spent for advertising in a big magazine, for the purpose of educating the public, is more than wasted.

It reaches ten college men and misses 690 voters.

That is why municipal ownership of telephones is so deadly possible.

Coupled with the irresponsibility of the voter is the public conception regarding the telephone.

When a telephone company sells out at a good price, and the surviving telephone company falls down in its relation to the public, every citizen of the town is prompted to look with favor upon municipal telephones because he believes it is a profitable enterprise.

There are too many precedents already, to give aid to municipal agitation.

I do not believe in municipal operation of utilities as long as a private company can handle them.

But private companies fell down lamentably on water service. They were always unwilling to extend their pipes.

Municipalities were forced into the waterworks game and have nicely succeeded. None dispute it.

We hear a great deal about municipal electric light failures. And there are some successes, too. Plenty of them.

I have read much about the Cleveland municipal railway plant and its failures, but there is nothing in the operation of the system which indicates service failure to the patron.

We often hear that municipal telephone failures would be legion. No reason exists why a municipal plant can not succeed.

Cities are fast coming to commission government and they can contract with good men just the same as a private company.

There will be many efficient telephone men on the market, if the proposed mergers ever take place.

They could make any municipal telephone system a success.

Ignorant men will ruin private enterprises as well as public ones. And a municipality need not employ ignorant men any more than a private company.

You have seen private concerns all shot to pieces by nephews and sons-in-law, as well as other relatives. No private concern I know of its entirely free from nepotism and favoritism. Every company is cursed with dead ones. And that is exactly what most writers against municipal ownership argue the loudest about. Political favorites cannot be much worse.

It is a good plan to get the mote out of the private ownership eye, before we pluck the beam out of public ownership.

It is natural for a city to operate its own police and fire departments. Surely there is no more of a natural affinity to these activities than the telephone. It is only a short step to extend police and fire service to the needs of public and commercial service.

I heard a salesman say he would dislike public ownership because he would have to deal with city councils and mayors.

I have never been on a sales deal with an Independent telephone company which did not have as many directors as a city council.

As a rule, the personnel of the two concerns are the same. And their business occupations too.

We all depise politics, or pretend to do so.

Cities have to be operated. Someone has to be mayor and others have to be councilmen. How else could city business be run?

No reason exists why the results can not be the same.

I have seen enough private business fiascos with fearful extravagance at the bottom, to make me lose my respect for the business judgment of 98 per cent. of the human race. And this does not exclusively apply to the medium-sized business man. Nor to the small one.

If municipal telephone systems ever come to the United States, it will be the result of an economic condition.

The people seem to like to vote on any municipal project.

The financial world, having made financing impossible, merely forces municipal financing.

It is a pity that the telephone offers so many inducements to the public.

No one would start out to build a railroad or trolley system. But anyone will cheerfully tackle a telephone system. It looks so easy and few realize how quickly it runs into money.

I have ever been in hopes that the telephone situation could be solved along lines of private ownership. I still think it can be done.

We can generally rely on the American people being sensible in the long run. They will make no great mistakes, even if there is a majority of the irresponsible vote.

The great lesson to be learned is a realization, on the part of industrial concerns, that moulding public sentiment is an extravagant and useless game. If every industry kept its own internal movements in order, they would have little to fear from outside forces.

Municipal ownership of telephones may come. We can but wait for results.

The telephone seems to be the stormy petrel of industry.

MORAL: Mortals can only guess.

Efficiency Engineering in Telephone Traffic Work

Analysis, the Keynote of Efficiency Engineering—The Study of Costs—Factors Entering into Local Operating Costs —A Paper Presented at a Meeting of the Indiana Bell Telephone Society, Reprinted from the Bell Telephone News

By J. Lloyd Wayne, III

From a scientific point of view, the efficiency of any process is the ratio of the input and output. With an over supply of available energy, efficiency may be increased by increasing the effective input while keeping the waste constant. It may also be increased by decreasing the waste. For example, take the case of the efficiency of the steam engine. The efficiency of the process is represented by the ratio of the heat units in the coal pile to the units of useful work. It will be understood that anything which puts more heat units out of a given pound of coal into the steam engine will increase the efficiency; also anything which cuts down the friction or improves the operation of the engine, or which cuts down the radiated heat, will increase the efficiency.

Strictly mechanical processes have been studied for a long time from the efficiency standpoint. The application of this principle to the study of human endeavor has, however, been confined to a very recent period, so recent in fact, that when Mr. Brandeis, a Boston lawyer, remarked a year or two ago that "by the application of scientific management the railroads of this country could save a million dollars a day," all the country "sat up and began to take notice."

The information that went with this remark showed "scientific management" to be a study of efficiency, and as interest was centered upon this subject, it was brought out that there has been a group of men, styling themselves "efficiency engineers," who had been working for some twenty years improving processes involving human labor. They had done their work quietly without attracting the attention of the general public. The new interest awakened in the subject by Mr. Brandeis was so great that magazine after magazine published articles upon it. New books bearing upon this or that phase of the subject were published. Books and articles which had been heretofore published, were revived and given a considerable circulation.

The keynote of efficiency engineering seems to be analysis, Analysis alone, however, will not get one anywhere. To get results, the efficiency engineer must also be a good synthesist; that is to say, he must, after obtaining the fundamental parts by analysis, build them up in an open minded way, so that they will have a better arrangement than the original structure. In other words, in rebuilding, the parts must be assembled upon a scientific and logical basis without regard to the dictates of habit or tradition.

A moment's thought will show that there are two main factors in every process involving labor. These are the "appliances" and the "workers." The problems of the two are very different. Improvements in appliances may be effected by pure invention and design. Improvements in the worker (that is, in his output) require not only the devising of a new method but also the adjustment of the worker individually so that he will be willing to use the improvement and have confidence in its success.

Scientific Management.

Probably the first systematic efficiency work was done by F. W. Taylor at the Midvale Steel Works. Most of us have read how he later at the Bethlehem Steel Co., multiplied the day's work of a gang of laborers, without really overburdening any man. He accomplished this by studying "fatigue"; by discovering that his men worked too fast in the morning and too slowly in the latter part of the day; by applying a stop watch and teaching each man to work at a uniform rate and to cut out lost motions. In this case there were no changes whatever in the appliances, as the men were merely loading pig iron. In the machine shop Mr. Taylor found it necessary to give attention to the appliances. His work here resulted in the production of air hardening steel, which has revolutionized machine shop practice.

Co-ordinate with Mr. Taylor were a number of other engineers, each following up efficiency work upon that line which appealed to him individually. Some of these men devoted themselves more particularly to shop arrangement in order that work be passed through the various processes in the shop, in a definite and fixed direction. Others devoted themselves to the study of wage systems and rewards, in order that the worker would be stimulated to put forth his best efforts. Another phase of the question is that of "motion study," by which is meant a reduction of the motions of the worker to the minimum required to accomplish the task.

No matter which side of efficiency engineering one of these men has undertaken, all seem to agree that the first attention must be given to a study of costs. To this end the work is analyzed and the proper proportion of the costs assigned to each part. Those parts of relatively great importance in determining the cost of the whole are then analyzed in great detail in order that every bit of waste may be cut out. When everything possible has been accomplished with these then the smaller items are undertaken, etc.

Unit Cost System.

I believe we can all now see a foundation for our unit system. This is evidently the foundation of a study of efficiency. The problem is considerably more difficult with us than with many of the shop processes, for our work and workers are scattered for the tangible part of our output and where our force is concentrated, as in the traffic department, the output is largely intangible. These peculiarities of our work lead some to question the possibilities of applying efficiency engineering methods. Personally, I believe it can be done, and it is being done, and that we shall see a more and more scientific application of these principles.

In applying unit costs, we must have, of course, a uniform work unit. Here, I believe, we shall agree we have been weak. We have been told in the past that "in the long run our jobs will average up," or that "any two considerable areas will compare," etc. I, personally, do not believe that this is so, unless we interpret with a clear knowledge of the local conditions. I think we may expect a gradual adoption of more satisfactory and specific units. This seems to be quite near with the traffic department, for a "fundamental work unit" has now been adopted. This is 15.65 seconds of an operator's time; that is, 230 units constitute an hour's work. From another viewpoint, the unit is "one completed flat rate call on a No. 1 full multiple switchboard from one direct line to another direct line in the same

office." Every other duty of an operator may be expressed in multiples and fractions of this unit.

Costs will probably soon be expressed for all traffic work, both local and toll, in cost per work unit. Of course, while values in units may be or have been assigned to each class of call, nevertheless these values will undoubtedly change as experience with results become wider.

Local Operating Costs.

While waiting for the establishment of our unit and unit relations we can, of course, begin the application of efficiency principles. Let us investigate and analyze local operating costs from this standpoint. Fundamentally our cost depends, as stated previously, upon the appliances and the worker; however, a little more specific division will be:

1st. The appliances.
2nd. The average cost per employe hour.
3rd. The output per employe hour.

Before going further into this, however, it should be stated that the quality of output is supposed to be fundamentally fixed. This standardizing is easy where the product is tangible and may all be inspected. Where it is intangible, as in our work, the problem is more difficult. It is easy to inspect a part of the product, sufficient to indicate whether or not the standard is being approached. However, there is no possibility of inspecting every part of the product. The best we can do is to make our inspection simultaneously with its delivery to the customer.

Now to revert to the items fixing costs. With us the appliances for service must of course be studied. In numerous instances we can probably improve in better types of switchboards. However, in the usual case, the type of switchboard is usually pretty well fixed and in those cases where it is not fixed, a change can only be accomplished after considerable time. I shall pass over this item without further discussion in order that we may get to the more human side.

The second item, the "salary per employe hour," is important and worthy of study at each point. We should, of course, pay that salary which will bring us the minimum cost in the long run. In saying this, I do not wish to be understood to mean that this is at all the lowest salary at which we can employ help. As with the appliances, changes in salary scale do not usually bring immediate results. To get quick results, we must study the third item.

This third item, "useful work units per employe hour," depends upon many factors, such as character of the employe, the state of mind, contentment, personal ability and personal interest. In fact, to classify more systematically, it may be said that the useful work unit per employe hour will depend,

1st. Upon the natural capacity of the average worker.
2nd. The special education or knowledge of the job.
3rd. The acquired skill or practice.
4th. The degree of effort.

Changes in items one, two and three are a matter of considerable time. Item four is the only item which we can change quickly. Gilbreth in his book, "Motion Study," tells us that this item four is dependent,

1st. Upon the variables of the worker.
2nd. Upon the variables of the surroundings; and with our work should be added to this—
3rd. Supervision.

Variables of the worker are divided by Mr. Gilbreth into the following factors, to which I have added comments:

1st. Anatomy, i. e., condition of senses and frame.
2nd. Brawn, i. e., suitable muscular development.
3rd. Contentment—enables the mind to be kept on work.
4th. Creed—differences sometimes cause petty strife.
5th. Earning power, i. e., chances of increasing remuneration by good work.
6th. Experience, i. e., experience in our work or other service.
7th. Fatigue—of three classes: That brought to the job. That due to unnecessary actions. That due to necessary actions.
8th. Habits, i. e., personal habits.
9th. Health.
10th. Mode of living.
11th. Nutrition.
12th. Size—suitable to the work.
13th. Native skill—as affecting deftness and speed.
14th. Temperament.
15th. Training, i. e., general training in everyday affairs.

I think you will see at a glance that improvements in any of these items affects the output, and we could probably spend an evening discussing these. It does not seem worth while now to more than direct your attention to them.

Similarly, it will be well to enumerate the factors included under variables of surroundings. In enumerating these I will give some suggestions as to how each may apply in the operating work. The factors are:

1st. Appliances, i. e., special appliances, rather than the main switchboard.
2nd. Clothes—suitable for the work and freedom.
3rd. Color, i. e., relative color of the light and apparatus.
4th. Entertainment, i. e., for relief hours.
5th. Heating, cooling and ventilation.
6th. Lighting—such as degree, bothersome reflections, etc.
7th. Quality of material—not in our work.
8th. Rewards and penalties, i. e., for special standards attained.
9th. Size of unit moved—akin to most efficient hour load.
10th. Fatigue—eliminating devices.
11th. Surroundings, i. e., cleanliness, spaciousness, etc.
12th. Tools—with us, condition of apparatus, operator's tools, pencils, etc.
13th. Mutual agreement, i. e., agreements between employes.
14th. Weight of unit moved—corresponding to tight jacks, too heavy key spring, tight fitting cords, etc.

In the matter of item three, "supervision," the factors are probably:

1st. Quality of supervision.
2nd. Temperament.
3rd. Relation with workers.
4th. Methods.
5th. Proportion of supervisors.
6th. Efforts of supervisors.

Many of the sub-classifications, you will see, are largely inter-dependent, and I believe that one could not effect the desired improvement by applying them one at a time. The general scope of them is what is interesting here.

Good Already Accomplished.

I doubt if any of us would hazard the suggestion that he had attacked his problem in any such detailed and systematic way as this. However, having the above factors in mind, it is interesting to consider what may have been done. As a matter of fact, I believe there has been something done along this line in the traffic department.

For example, in that matter of supervisors, the supervisors have been coached in methods, improved ideas of supervision have been introduced at several points, the number of supervisors has been adjusted, effort has been

(*Continued on page* 606.)

Some of the Requirements for Successful Competition

Modern Equipment and Up-to-the Minute Service Prime Requisites for the Present Day Telephone Company—Effects Upon Independent Securities—A Paper Read at Western Pennsylvania Association's Convention at Cambridge Springs, Pa.

By Frank L. Middleton

It is not my intention here to advance technical theories nor is it my intention or desire to antagonize your preconceived ideas, or your own worthy conception as to what may make for financial success in your chosen line of endeavor, but it is my intent to create food for thought.

Frank L. Middleton.

When Independent telephone men can be brought to fully realize that the perpetuity of the industry or the stability of their investments depends on two intensely important factors which should and must receive careful consideration, at that time and not until then, will Independent telephony really again come into its own. We are passing through a transitory period and with the immortal Hamlet we must ask is it "to be or not to be? That is the question."

I am not a pessimist. I believe to-day as I have always believed, that Independent telephony is intrenched in an almost impregnable fortress, but, at the same time, this fortress demands protection, the ingenious thought and action of capable men, or it will not always be impregnable, for its ramparts will fall asunder.

Not until certain conditions are contended with and handled to the best interests of the Independent operating field will Independent telephone securities hold or merit (nor should they), the same consideration in the financial world which is to-day accorded the securities of other public utility corporations.

The essential factors are reasonable, but by no means "monopolistic," rates and absolute economy in cost of operation, and at the same time, a service standard second to none. Upon this standard of comparison as well as that of rates will your prestige with the telephone using public be measured, and upon the same basis will your securities and your standing in the world of finance be measured.

You who are fortunate enough to have your investments centered in the average city of a few thousand population are to be congratulated, for, with fair service, you should be able to command a reasonable rate, and a condition practically void of serious competition. By reason of your personal acquaintance with every subscriber you naturally will have instilled into each mind a spirit of loyalty to a local institution which, in this day of cold commercialism, does not accrue to the advantage of the operator in the busier marts of trade, the larger cities, where promptness, secrecy and absolute dependability of service become essential factors in holding the good will and patronage of the business public.

It is to these operating companies, therefore, who have to contend with cold, unsentimental conditions in the matter of competition, with heavy expenditures for rehabilitation, with perhaps inadequate rates for services rendered, to which the subject of economies and profits and readjustment of rates, following improved service conditions, should more particularly appeal.

To the credit of the operating field it may be said that these subjects are almost universally receiving careful consideration, a consideration born of economic necessity, and by talented men who are devoting their time and their energies to the conservation of a legitimate, honorable and worthy enterprise, for the best interests of a business and social public, their subscribers, and may I add, for the best interests of their own financial prosperity.

Property values are being regulated, improved and modern service methods, which admit of greater operating economies and consequently enhanced earnings, are being installed and, in many instances, by special legislation, either state or local, it has become possible through the adoption of such improved service methods to secure revised rates which are commensurate with services rendered, and which must necessarily accrue to the investor in the way of increased property values, or dividends, in proper proportion.

I do not wish to be understood as advocating an increased rate for local service where such rate is not warranted by improved service conditions, first of all, and secondly by an increased number of possible local connections brought about by better service, and perhaps by the elimination of competition.

Right at this point I wish to digress from my main topic long enough to assert that we in the Independent telephone field have found that Sherman was right. We have found that competition was just what Sherman said war should be termed. From our standpoint we have called this war one of competition; from our opponent we have learned that our activities are called "opposition" and my use of the term "elimination of competition" is taken from our standpoint. From that standpoint the only legitimate use of the word "elimination" is through winning our fight by supplying a higher grade of service to a greater number at a more reasonable rate. This is a class of service which does not call for General Sherman's characterization—a policy which must necessarily result, and in hundreds of instances has resulted, in absolute "elimination" and by our own original method of warfare, that of legitimate rates and better service.

Reasonable expenditures for new construction or equipment, the necessities for which were perhaps not contemplated at the time of your initial installation, must also be taken into serious consideration, but even these circumstances, which bring up the subject of unanticipated depreciation, cost of maintenance and kindred similar expenses, should merit a "go-between" or midway policy, a policy of good faith with the subscriber and of justice to yourselves. For you must not forget the day when you called your monopolistic competitor a "Blue Bell Dragon" seeking whom he may devour, and when you promised to furnish better service to five times the number of subscribers at half the price, and, by the way, "made good" for the time being at least.

The subject of economy in the cost of operation is the "open sesame" to the matter of increased earnings, and how to accomplish such economies, cost of equipment and conditions attending its use being considered, has hitherto been a somewhat serious proposition.

Some of the more recent improvements or developments

in type of central office equipment have made this possible, however, while but little, if anything, has been accomplished along the same line as to construction economies, though it is a fact that maintenance and depreciation costs have been reduced to a minimum in cities where the idea of underground cables with carefully worked out distribution is in vogue.

The matter of urnishing a class of service which is superior to that furnished by your competitor is worthy of sincere thought, for he has the advantage in one important respect, that of almost continental long distance service. But, along other lines, there should be no serious comparison, for, without intending to antagonize any manufacturer, I firmly believe that the Independents have by far the best of the situation as to equipment necessary to provide the best telephone service in the world.

Along this same line, however, again comes the subject of economy in the cost of operating, which, no matter what the initial cost of equipment may be, must be considered as against the cost of such equipment, its depreciation, cost of up-keep or maintenance and other items of like import, as compared with other systems in the use of which such economies may not be so evident.

I have so frequently referred to the importance of superior service combined with operating economy and its necessary relation to your financial success in the operating field, that it is perhaps incumbent upon me to outline briefly the necessary features of such service as developed by somewhat recent improvements in the art.

The Business Man's Requirements.

The business man of to-day is exacting, as you who are business men and men of affairs are well aware. The time has passed when he will countenance poor or mediocre telephone service, a service which is slow and unreliable, a service upon which he cannot place implicit confidence in every respect, any more than he would countenance inefficiency and unreliability on the part of a trusted employe. What else are you than trusted confidential employes of the telephone-using public? You sell service. You do not rent telephones or apparatus, and to be honest with your employer you must give him all that he has reason to expect of you.

The business man of to-day, then, requires good service. That means that, when he takes down his receiver, he wants an instantaneous response from the operator. Ten seconds waiting for a response from "central" seem like sixty.

If he wishes to call a dozen numbers consecutively he will be exasperated if he has to wait for a disconnect. And why not?

The subscriber is entitled to service which is as private and free from leaks as if all of his business affairs were conducted in the privacy of his own office.

If he has a party line telephone in his home he wants selective service. He doesn't want his neighbors to know when to listen in when he talks to his wife, nor does she when she comments with a friend on the horrible fit of the gown worn by Mrs. Jones at the reception last night.

If he calls for a busy line he wants to know that the line is busy and only one out of ten will believe the operator. Give him a "busy buzz" over which the operator has no control and he will be satisfied.

If the called party "don't answer," don't make it possible for him to say "Don't believe she tried." Give him an intermittent electro-mechanical signal over which your operator has no control and which will convince him that your equipment is performing its proper functions.

Combined human intelligence and modern up-to-date equipment at the exchange, a good telephone at the subscriber's station, attention to business details on the part of the management—all these mean profits—the result of good service and economy.

Cost of Concreting Wooden Poles at Indianapolis.

The Indianapolis Light & Heat Co. now makes a practice of concreting all its poles at the ground line to prevent rotting and deterioration, some 1,500 poles having been so treated during the last season, says a writer in the Electrical World. New poles are erected and first allowed to stand a year to make sure that they have become firmly set. With a small spade an opening 4 in. to 5 in. wide is then made all around the pole to a depth of 3 ft. or 4 ft. This is poured full of concrete, tamped securely and troweled off with an inclined water-shed to prevent water from standing about the base. The concrete collar extends a few inches above the ground.

A concreting gang of four men with a team can concrete eight to ten poles in this manner in a day. Estimating the cost of keeping such an outfit in the field to be about $15 a day, T. A. Wynne, general superintendent of the Indianapolis company, figures the cost of concreting poles at $1.50 each. Experiments with inclosing the poles in a covering of concrete before erection have also been carried out at the company's pole yard, and poles have been inserted into rectangular concrete butts and braced with heavy steel straps bolted to the wood.

Another departure involved the fixing of the pole on a rectangular concrete butt, 20 in. at the base and tapering to 15 in. at the upper end, 5 ft. distant. The connection was made by means of four 2-in. by ⅜-in. straps, crossing and inclosing the concrete butt as in a basket. These earlier experiments have all been discarded, however, in favor of the new plan of concreting at the ground line, the portion to which the major part of the deterioration is confined.

EFFICIENCY TRAFFIC ENGINEERING.

(*Continued from page* 604.)

made to improve the relation between operators and supervisors, competition between supervisors has been started where they are in sufficient numbers.

Take the matter of surroundings. Considerable has been done—rest rooms and operating rooms have been cleaned up, broken furniture has been replaced by new, needed lockers are being provided, the light has been adjusted by better window shades, good ventilation has been preached, more fans have been provided, the tools have been watched closer as the plant men will testify, and there is coming a new operator's chair for lessening fatigue. We are, also, now considering a standing rest for the operators of five minutes at stated periods. This is now done in New York.

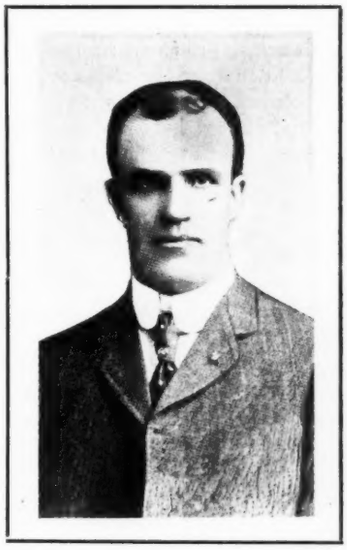
In the matter of variables of the worker, we have interested ourselves so far, most in sub-item No. 3, that is, "Contentment." It has been our endeavor to make each operator feel the importance of her personal interest in the work and her personal effort.

As a matter of fact, probably no results have thus far been apparent in reducing costs. The reason for this is, that our product was not standard. I hope the standard is a good deal higher now than it was a year ago. Unfortunately, we are not thus far well enough equipped with observing apparatus to state this upon any stronger evidence than that of impression. When we get general observing apparatus and a service observing department installed, we can speak with more assurance. Then, in case reduction does not follow after a reasonable time, costs are strictly commensurate with the appliances and and careful analysis, we may rest assured that our present grade of service given.

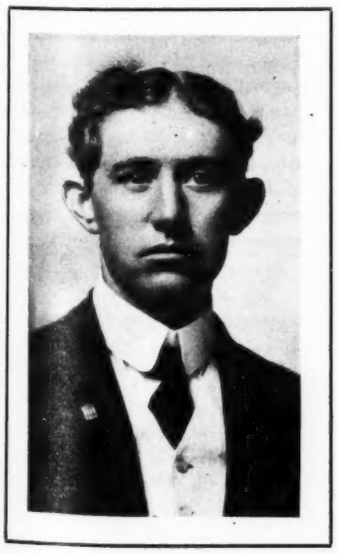
A Quartet of Men Prominent in the Telephone Field

CHARLES P. LINDSLEY, president of the Lindsley Brothers Co., Spokane, Wash., was born in Neenah, Wis., July 18, 1867, and was educated in the Neenah schools. For twelve years he was a traveling salesman for Pingree & Smith, of Detroit. Later, as general manager of the Panhandle Lumber Co., he built that company's mill at Spirit Lake, Idaho. He became general manager of the Craig Mountain Lumber Co., of Winchester, Idaho, of which concern he is now vice-president. He is also treasurer of the Western Wood Preserving Co., of Spokane. On March 26, 1901, he entered the corporation of the Lindsley Brothers Co., which then consisted of G. L. and E. A. Lindsley, and of which he became president. Mr. Lindsley is a member of the Spokane Club and the Modern Woodmen of America. The Lindsley Brothers Co. specializes in western cedar poles, cross arms, etc., and may fairly be considered pioneers in the western pole industry. The business was organized in 1896, in Menominee, Mich., with offices in Chicago. The Spokane office was opened in 1901, when C. P. Lindsley associated himself with the company.

CHARLES C. DEERING, manager of the New State Telephone Co., with headquarters in Omaha, Neb., was born in Moingona, Iowa, November 29, 1871. He is a graduate of the Iowa State College, with the degree of B. Sc. He is a Mason and a Shriner. Mr Deering has been prominently indentified with the Independent telephone business in Iowa for many years. He associated himself first with the Boone County Telephone Co., Boone, Iowa, in 1896, as secretary and manager. Later he became superintendent of the Mutual Telephone Co., of Des Moines, Iowa, from which position he went to his present one of manager of the New State company. His activity in Independent associations is indicated by the fact that he was for ten years secretary of the Iowa Independent Telephone Association, was secretary of the National Independent association one year and a member of its executive committee a year, and has served as president of the Iowa Independent Toll Clearing House since its organization. He has also been a member of the executive committee of the Nebraska association and has been active in its proceedings.



CLINTON A. SHOCK is general manager of the Grayson Telephone Co., Sherman, Texas: secretary and treasurer of the North Texas Telephone Co., of Sherman; and president of the Union Telephone Co., McKinney, Texas. He was born on a farm near Lima, Ohio, March 13, 1875 and was educated at Lima College and the Ohio Northern University He is a member of the I. O. O. F., the Young Men's Business Association and the Commercial Club, of Sherman. For ten years before entering the telephone field Mr. Shock taught in the public schools in Allen and Auglaize counties, in Ohio. In 1902 he became secretary and treasurer of the Elida Mutual Telephone Co., of Elida, Ohio. In 1904 he was made general manager of the Grayson Telephone Co., at Sherman, Texas, which position he still holds. Since removing to Texas he has organized the North Texas Telephone Co. and the Union Telephone Co., mentioned above, has worked actively in their development and holds executive office in both. He was secretary of the Texas Independent Telephone Association for two years and is now a member of the executive committee of the association.



THOMAS S. HEMENWAY, treasurer of the Ericcson Mfg. Co., Buffalo, N. Y., has spent practically all his business life in the telephone business, in the manufacturing end of it. He was born in Auburn, N. Y., May 17, 1882. He graduated in 1901 from Pritch College, Glasgow, Mo., with the degree of A. B., and went with the Ericcson company in New York City. Two years later he entered Purdue University, La Fayette, Ind., specializing in telephone engineering, and graduated in 1906 with the degree of B. S. While studying, in the summer of 1904 he was associated with the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., working the next summer as installer for the Western Electric Co. After his graduation he again entered the service of the Ericcson company, in the engineering department. Later he was made sales engineer and, in 1909, sales manager. He gave up this position in December of that year to become treasurer of the company, in which capacity he still remains. Mr. Hemenway is a member of the University and Park Clubs, in Buffalo. He is an associate member of the A. I. E. E.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities, and Actions of City Councils Bearing Upon Franchises, Rates and Service

Rock Island to Vote on Franchise.

The city commission of Rock Island, Ill., has decided finally to put the question of granting a franchise to the Tri-City Automatic Telephone Co. before the voters at the fall election. It held that, as the company had been voted franchises by the people in both Moline and Davenport, the citizens of Rock Island should have the same opportunity to accept or reject the proposition. The company proposes to build the three cities.

New York Commission Cases.

Milford D. Whedon, of Granville, Washington county, has made complaint to the Public Service Commission, New York, as to charges of the New York & Vermont Telephone Co. for extension residence and business telephones.

The complainant appeared in person and stated that there was no basis upon which the company charged 50 cents a month for extension telephones, claiming that this was an amount determined upon arbitrarily. For the telephone company Howard N. Hendrickson of Albany, stated that this rate was the same as that exacted by other telephone companies throughout the country. He contended that such charge was reasonable. Attorney Swayze asked that the New York Telephone Co. be considered a party in this proceeding inasmuch as any action taken by the commission on complainant's request would materially affect that company's business throughout the state.

Attorney Swayze pointed out the impracticability of determining the cost of an extension service. He said that engineers of his company had found it almost impossible to ascertain the cost of this character of service. To determine the cost of operating extension telephones Mr. Swayze said it would be necessary to make special investigations in the locality in question because of the varied conditions which prevail in different sections in which telephone companies are operating.

A further hearing will be held at Albany, December 3, at which time the telephone companies will produce evidence as to the cost and value of extension service. Other telephone companies will be notified of this hearing in order that they may enter an appearance in the case if they so desire.

The commission has received a complaint from Alfred H. Weston, of Brooklyn, asking the commission to require the New York Telephone Co. to install at his place of business a booth with public slot machines for coin in place of the private service which he now has. He states that at present there is no booth on his side of Fulton Street or within a quarter of a mile from his office. He urges that in a building devoted to office purposes there is more reason for a booth than in the candy or cigar stores, where he states they are plentiful. The complaint has been served on the company and an answer required within twenty days.

The commission has authorized the Black River Telephone Co. to issue its second mortgage bonds to the amount of $50,000. The bonds are to be sold at not less than 94 and the proceeds used solely for the purpose of retiring the $50,000 of first mortgage bonds due and payable on January 1, 1913.

The commission has received complaint from the United Holding Co., operating at Bellerose, town of Hempstead, Long Island, directed against the New York Telephone Co., asking the commission to reduce the rate from Bellerose to Manhattan and Brooklyn by the sum of five cents a message and that the Long Island toll service to Manhattan and Brooklyn be improved. The telephone charge to Manhattan is 20 cents for subscribers and 25 in public booths. The property across Jericho turnpike in the borough of Queens, less than 100 feet distant, gets the same service for five cents less. The complainant alleges that it has derived no benefit whatever from the recent reduction made by the telephone company between Manhattan, Brooklyn and Queens boroughs. The complaint has been served on the company and an answer required within 20 days.

Refuses to Enjoin Lower Memphis Telephone Rates.

The United States Court of Appeals, at Cincinnati, has refused to grant an order asked by the Cumberland Telephone & Telegraph Co. to restrain the city of Memphis, Tenn., from enforcing an ordinance requiring the company to make certain reductions in its rates.

The Situation at Denver, Colorado.

A bill drafted by the Denver (Colo.) Business Men's Association, looking to the reduction of the rates and improvement of the service of the Mountain States Telephone & Telegraph Co. in that city, was rejected by the aldermen, who substituted for it another resolution having the same end in view.

The resolution fixes, temporarily, the same rates as those provided for in the original measure. It also demands that the Mountain States company shall file acceptance of the rates within ten days, after the bill takes effect, and shall also make application as soon as possible for a franchise, this application to be submitted to a vote of the people. If the telephone company fails to do this, condemnation proceedings shall be started by the city against the corporation.

The measure will go to the board of supervisors for action and will become effective immediately upon its approval by the mayor.

The temporary rates which the telephone company is ordered to put in effect are:

Business telephone, unlimited service, $7 a month; limited, 4,200 calls a year, $4 a month; two-party, 3,200 calls a year, $3 a month; four-party, 600 calls a year, $1.50 a month. All private branch exchanges are to be leased at an annual rental of not more than 14 per cent. of their actual value, with due allowance for depreciation; all main lines leading to a private exchange are to be charged for at the rate of $7 a month each. Extension telephones are to cost 25 cents a month. Free service is forbidden.

Residence rates for unlimited service are fixed at $3 a month; One-party lines, limited to 1,500 calls a year, $2 a month; two-party lines, 1,200 calls a year, $1.50 a month; four-party lines, 600 calls a year, $1 a month.

Hearing on Albany Rates.

The hearing on Bell telephone rates at Albany, N. Y., on October 9, attracted a large number of prominent business and professional men before the New York Public Service Commission. President E. N. McKinney and a large number of members of the Chamber of Commerce were present, also a large delegation from the Boosters' Club.

At the outset those present heard that the telephone systems

(*Continued on page* 628.)

The Telephone Inspector and the Troubleman

The Sixth Installment of a Series of Articles Which Deals in an Elementary Manner With Many of the Problems Encountered in the Operation of Small Exchanges—Some Cable Trouble—A Case of Cross Talk Between Grounded Lines

By A. E. Dobbs

"Now," said George, "we have another cable on the roof that is very bad, so bad, in fact, that any wire in it will show a slight ground. As the cable is only about 60 feet long, that looks bad for the insulation. It is a home-made cable, consisting of common annunciator wire drawn into a rubber hose."

Some Poor Cables.

"H-m-m, better have left the hose off," rejoined Johnson, "it probably is full of water, or at least pretty damp."

"That's what I think," responded George. "Here is a lot of No. 18 weatherproof wire. It seems to be pretty good, and I think we had better make up a cable of that to take the place of the other one. We will put no covering at all over this one. Merely lash it together, not too tightly, but just tight enough to hold it in shape, so that if it does get wet it will dry out again. I would much prefer rubber covered wire but we haven't any of it."

They went industriously to work, and by night had the new cable up, and some of the wires changed over. By 10 o'clock the next morning, the change was complete.

When the old cable was taken down they found, as they had suspected, that it was very damp on the inside, and the wire was laid out to dry, after which it was set aside to be used for various odds and ends around the shop.

"No more rubber hose will be used around this exchange," said George.

"That's right," chipped in Johnston.

"There is only one way to make an outdoor cable of annunciator wire," he continued, "and that is to enclose it in a lead pipe and seal up the ends with some of the paraffin or asphaltum compounds, so that the moisture cannot get in. Fixed that way a short length of this kind of cable is practically as good as any."

"Now," said George, "that we have finished this work, we'll go out over the lines this afternoon, to see what will be needed to put this plant in order for the winter, for there have been all kinds of work, good, bad and indifferent, done here. We can all easily put in a month fixing up things, but we will spend half a day looking the ground over, to see which parts are the worse."

A few days after this Will had a trouble that puzzled him considerably. A certain line during three or four nights was reported grounded, and as soon as he got around to it, which was generally between eight and nine o'clock in the morning, it was clear. Suspecting trouble in the house loop, he had followed that up and gone over it carefully without discovering anything. The wire passed under an iron fire escape, but it cleared that by one inch.

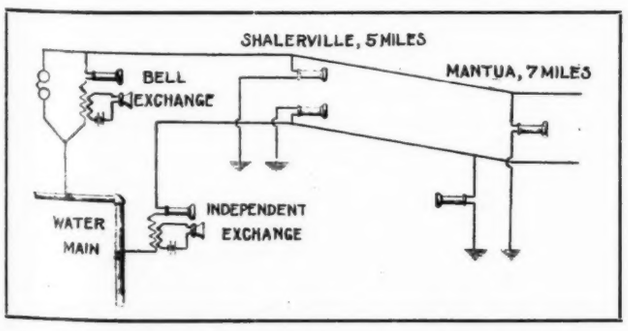


Fig. 8. Diagram Showing How Cross Talk Occurred.

Determined to find it, he got up one morning about 5:30 and went over it again and found to his surprise that the wire was drawn up against the fire escape. The fire escape was fastened to the tin roof, which in turn was grounded through drain pipes and water conductors. Then he remembered that the nights had been very cold for the last week, which had pulled all the slack out of the wires. Troubles of a similar nature have sometimes happened in hot weather from wires slacking down on a tin roof. Of course, having found his trouble, it did not occur again.

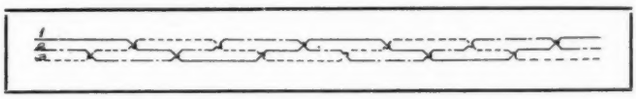


Fig. 9. Transposing Three Grounded Lines.

"Come to think of it, I have a letter here from one of my old friends I ought to answer pretty soon," remarked George one rainy day. "It reads:

"'I have two grounded lines running parallel for ten miles, and would like to get rid of the cross-talk. Would transposition at regular intervals help me any?'

"No," said George, "it wouldn't. You will notice that he doesn't say whether the lines are of the same length or not, or whether they bridge or loop into the same stations. Unless the cross-talk is very bad, I would advise him to let them alone. The insulation between the lines may not be perfect; then they may be grounded at the same places more than once, which would aggravate the troubles.

"I can remember a bad case of interference between two different exchanges due to this cause. The lines were laid out like this (Fig. 8). Both exchanges were grounded to the same water system which made a good connection between the two as far as the exchange ends were concerned. About five miles up the road was a small village called Shalerville with only one store, in which both companies had placed telephones for toll business. Both telephones were grounded to rods, placed only two or three feet apart in a wet clay soil. Seven miles farther out was the village of Mantua, in which the two toll instruments were again placed in the same building with ground rods as before only a few feet apart in wet clay soil.

"The two lines took opposite sides of the road, but from the position of the ground rods at Shalerville and Mantua, you can see that the resistance between the two lines was less than that of the return back to the office. The two exchange managers would not speak to each other, but the operators and patrons did. Both lines have since been rebuilt as metallic circuits.

"I knew of one man who, in order to get around this difficulty with two grounded lines, grounded one in the exchange and ran the ground wire for the other about three miles out in the country and grounded it in a swamp, which helped him a great deal.

"Merely transposing two grounded lines with each other though, will not help him any more than putting two exchange subscribers in each half of a twisted pair of a cable, in which case there is cross-talk between those two but no

others. If our friends had more than two grounded lines running parallel, he might help matters by cross-connecting them one side of the pole to the other, something like this (Fig. 9). In this case the middle wire acts as a shield and each wire takes its turn in the middle. In transposing in a case like this, make a transposition every half-mile through a quiet country, at least."

"In case of trouble it would take a lineman as smart as a Chicago lawyer to keep track of his wires," remarked Will.

"Oh, I don't know. If the lines are crossed or broken, you can see three as easily as one. As you are not supposed to make any bad joints in a toll line, there should be no resistance trouble. If you have occasion to cut a line for testing, find out which one to cut, which you can easily do with a testing set by calling the operator a couple of times."

WILLIAM'S USEFULNESS.

"Well, I must say I've had a very easy time of it the last few days," said Will, as he prepared to go home for the night. "This trouble has been cleared up so completely that I am afraid there will soon be nothing for me to do."

"Has the manager said anything to you?" asked George.

"No, not yet."

"Have you heard me say anything to that effect?"

"No."

"Well, let me tell you something. You are hired by the month to take care of trouble here first of all, and you are not required to do anything else when there is trouble. With our present number of subscribers, the troubleman must always be on hand, and when we need extra men we will hire them; but you must arrange your work so that the operators can always find you when they want you. If there is nothing for you to do, just you stay right here and wait for orders. If it so happens that you don't have a thing to do all day, sit down and wait, unless you can think of something else to do. To help pass away the time read a telephone paper like TELEPHONY and get hold of a book dealing with electrical subjects. The manager knows by this time that the trouble account is not an extra expense, but a fixed charge, and that's what you are here for."

(To be continued.)

Wisconsin's Comment on Interstate Accounting Plan

A Memorandum Submitted by the Railroad Commission of Wisconsin to the Interstate Commerce Commission Bearing Upon the Proposed System of Uniform Accounting for Telephone Companies Which that Body is Preparing—Second Installment

III. PRIMARY EXPENSE GROUPING.

The proposed classification of operating expenses are grouped under the primary expense division:

1. Maintenance.
2. Traffic.
3. Commercial.
4. General.

For class A companies the sub-accounts under this grouping are given in considerable detail. For class C companies only three items are reported, "commercial" and "general" being grouped under one heading "general." No detail is provided for these companies as to the items of expenditure making up "maintenance" and "traffic."

The proposed grouping recognizes a division of the *direct expenses* of production (maintenance and traffic) and the *overhead expenses* or selling and administrative cost (commercial and general).

Our suggestion relates to the grouping of direct expenses. It is urged that the separate operating expense items grouped under "maintenance" and "traffic" be classified in what appears to be the natural successive processes of furnishing service, viz.:

1. *Central office,* comprising all expenditures directly incurred in the operation of the exchange plant including operation, maintenance and rentals of exchange space.

2. *Transmission,* comprising all costs directly incurred in transmitting messages to the subscribers' premises, including upkeep, operation, and the rental of conduit, poles and roof contacts.

3. *Subscribers' station,* comprising all costs directly incurred at the subscribers' premises, including phone rents, removals and maintenance.

With few exceptions such a change will mean merely a rearrangement of operating ledger totals in the yearly statement for class A and B companies, but will involve changes in the classification for class C companies.

The scheme of grouping of operating expenses to cover specific portions of the business rather than the business as a whole is a well recognized principle of cost accounting and needs no elaboration. The only question arising is whether such an expense distribution is practicable in a uniform classification designed to fit a variety of operating conditions.

Classifications of operating expenses promulgated by the rule that it is not feasible to provide for such a segregation of operating costs. Departures from this rule have been made in the clearing account. (See classification of operating expenses for electric railways I. C. C., first issue 1908, p. 45, accounting series circular I. C. C. No. 30, p. 52), and in certain features of the operating expenses for outside operations. (See classification of revenues and expenses for outside operations, first issue, I. C. C. July 1, 1908; gas producing plants, 108; electric light and power plants, 92.)

The clearing account is devised to measure the specific cost of a portion of the business. In it are grouped all charges for a separate department or process of the business, the use of which is not confined to a single operation, such as stable expenses, engineering expense, house service expense, stationery and printing, injuries and damages, etc. The account is cleared at stated intervals by charges to other operating accounts and credits to the clearing accounts. Such a device is common in all systems of ascertaining manufacturing costs and has for its purpose the measurement of efficiency of a single separate portion of the manufacturing process.

In the gas, water, electric and heating utility business it has long been recognized that a separation of expenses by successive steps is desirable and practical. In the gas business, for example, it is customary to separately group all gas station expenses, including rentals and maintenance, from the expense of distribution and the expense at the consumers' premises. Similarly, in the water business all pumping distribution, and consumers' premises expenses are separately grouped. In the electric business station expenses are separately grouped from transformation, distribution and consumers' premises expenses.

(See uniform classification of accounts, New York Public Service Commission, First District, gas and electric; uniform classification of accounts, New York Public Service Commission, Second District, gas and electric; uniform classification of accounts, Railroad Commission of Wisconsin, gas, water, electric and telephone; standard classification of accounts, National Electric Light Association, 1910; uniform accounts

for water works, American Water Works Association, 1911. See also standard classification of operating syndicates, American Light & Traction Co., gas, electric; Stone & Webster, gas, electric; Byllesby Co., gas, electric; United Gas Improvement Co., gas; Doherty Operating Co., gas, electric; Hodenpyl, Hardy & Co., gas, electric and heating.)

It is difficult to see wherein the telephone is an essentially different business from the municipal utilities noted above. It supplies service from a central distribution point, its distribution plant is similar to the electric business, and it has a similar problem in adjusting its facilities to meet a peak-hour demand. That a similar successive grouping of operating costs is feasible in the telephone industry is evident from the successful operation of such a system in Wisconsin and in the large number of Independent telephone companies now following a similar expense grouping outside of that state.

Classification of telephone service is based in part upon consideration of the suggested grouping of costs. An examination of typical rates for service disclose:

a. A differentiation of the flat rate for residence and business service based upon consideration of difference in central office costs (see 1).

b. A differentiation of one party and many party rates based upon transmission costs (see 2).

c. Additional charge for service beyond the central zone based upon added transmission costs (see 2).

d. An additional charge for subscribers' services such as extension sets, auxiliary receivers, private branch exchange, additional directory listings, based upon additional subscriber costs (see 3).

Toll rates are usually made up of two charges, an initial rate for a limited conversation and an additional charge for each additional minute. Such a rate suggests and is frequently determined by the following classification of cost: (a) A message cost based upon total exchange expenses and (b) a minute message mile cost based upon transmission costs (see 2).

Switching charges are usually based upon central office costs (see 1). An increased part of the state commission's work consists in determining the reasonable expense of physical connection between telephone utilities. Interchange of service has been required by constitutional and legislative enactment in a large number of states. The expense of such connection must be reasonable and such reasonableness is usually determined either by special commission, as in Montana, by municipal authority, as in Texas, or by a railroad or corporation commission, such as South Carolina, Wisconsin, Oklahoma and Michigan. Such determinations necessitate a separation of central office expenses from total expenses. (Connecticut, General Statutes, 1902, sec. 3912; Ohio, Bates Annotated Revised Statutes, 1887-1906, secs. 3462, 3471; Oklahoma, Constitution of 1907, art. 9, sec. 5; Kentucky, Constitution of 1891, sec. 199; Missouri, Annotated Statutes, 1906, art. 6, sec. 1255; New York, Laws of 1890, ch. 566, art. 8, sec. 103; Vermont, Statutes of 1894, sec. 4257; Virginia, Laws of 1906, ch. 310, sec. 2; Louisiana, Laws of 1904, p. 28; South Carolina, Acts of 1904, No. 281, p. 496; South Dakota, Laws of 1907, ch. 239, sec. 8; Texas, Gen. Laws of 1907, ch. 12, secs. 1, 2; Michigan Pub. Acts of 1911, No. 138, sec. 6; Wisconsin, Laws of 1911, ch. 546.)

The substitute grouping of operating expenses suggested follows the grouping of fixed capital accounts as prescribed in the proposed classification (Accts. 200-274 inc.) and will permit a correlated comparison of investment, cost and traffic statistics essential in measuring relative efficiency of operation.

Dugald C. Jackson. *Is a Rational Basis Possible for Telephone Rates? Regulation of Municipal Utilities—King. Appleton, 1912:* "The plant statistics, the financial statistics, and the traffic statistics must be brought into association. The telephone companies have heretofore been satisfied to hold their accounting as a species of auditing capable of showing what dividends can be paid after leaving some surplus as the result of any year of operation, and they have failed to erect the accounting into a statistical structure which will afford data for judging the relative reasonableness of their various schedules of charges. The hesitancy of company managements to enter upon the keeping of full statistical records and the making of statistical studies of the business, when not compelled to do so by the influence of keen competition such as exists in some branches of manufacturing, is perhaps not unnatural, but it is a hesitancy that needs to be overcome for the joint good of the public and the serving companies." (p. 110.)

The suggested grouping of operating expense accounts will make possible comparison upon a unit basis similar to information summarizing Bell and Independent operation in Wisconsin noted below. Central office expenses are readily subdivided upon the basis of the number of lines for which the exchange is equipped. Transmission expenses are easily expressed in units per mile of wire line or per mile of pole line. Subscribers' station expenses are readily expressed in unit per phone connected. Such a computation of statistical units is not possible for class C companies under the classification proposed.

Typical Units of Comparison, Telephone Utilities in Wis-

	1909	1910	1911
Central Office Expenses Per Pine Equipped.			
Wisconsin Telephone Co.	$5.98	$4.89	$5.02
Independent companies, classes A and B.	5.50	4.95	5.60
Transmission Expenses Per Mile of Pole Line.			
Wisconsin Telephone Co.	$25.56	$33.01	$31.01
Independent companies, classes A and B.	44.76	33.33	37.49
Subscribers' Station Expense Per Telephone Connected.			
Wisconsin Telephone Co.	$2.34	$2.57	$2.53
Independent companies, classes A and B.	1.19	1.43	1.38
Commercial Expense Per Telephone Connected.			
Wisconsin Telephone Co.	$1.78	$1.71	$1.94
Independent companies, classes A and B.	.65	.84	.71

A desirable feature of any grouping of operating expenses is that accounts be so grouped as to furnish similar detailed information for each portion of the average dollar of expense. Under the proposed classification, the expenditures grouped under "maintenance" will aggregate 51.64 per cent. of the total operating cost. It is obvious that a more detailed analysis of this single item would be required of any class C company in any inquiry involving reasonableness of rates. A comparison of the proposed grouping of operating expenses and the substitute grouping here suggested is given in the attached table and is based upon returns made to the Railroad Commission of Wisconsin by the Wisconsin (Bell) Telephone Co. for the year ending June 30, 1910. (See next page.)

Various reasons have suggested themselves as to the purpose of grouping operating expenses as proposed in Accounting Series Circular No. 30. Several of these reasons apply to a similar separation officially adopted for steam and electric roads, but cannot be said to apply with equal force to the telephone industry.

It has been stated that, from an investor's standpoint, it is desirable to separately group all maintenance costs because of their relation to the capital account. In the proposed classification, however, there is included under "maintenance" items of expense such as routine tests and rearrangements of telephone plant, which have no relation to upkeep of property and represent operating expenses preparatory to the furnishing of service rather than upkeep costs. The practical objection to including items of this character in "maintenance" and "repair" accounts has been separately considered in this memorandum.

It has been suggested also that the grouping of expenses is similar to and in many respects identical with the classi-

fication provided for Bell telephone properties in the American Telephone & Telegraph classification No. 6, and is designed to fit the administrative organization of that company. It will probably not be seriously urged that the organization or convenience of a single company is a fundamental basis for uniformity of accounts, especially when it is considered that the separation of accounts of the Bell properties is provided for in such detail as to make arrangement for the purpose of report possible upon almost any desired basis. It seems obvious that the organization of any undertaking of considerable size is determined largely by the personnel of its management and may be expected to vary under different conditions of operation. Changes in the scope of primary expense accounts in A. T. & T. Co. accounting circular No. 6, issued November 15, 1909, and T. T. & T. Co. accounting circular No. 2, issued January 20, 1908, suggests that such differences may occur in the organization of a single company.

Two additional reasons have been assigned for a separate segregation of "maintenance" accounts. At the 1907 meeting of the American Street & Interurban Railway Asso-

Account No.	*Proposed Interstate Commerce Commission Classification.* Class B.	Per cent analysis.
	I. Maintenance Expenses.	
801	Supervision of Maintenance	
802	Repairs of Aerial Plant	[1]6.12
803	Repairs of Underground Plant	.44
804	Repairs of Central Office Equipment	3.92
805	Repairs of Station Equipment	3.94
806	Repairs of Buildings & Grounds	.43
807	Station Removals and Changes	[2]6.17
808	Depreciation of Plant & Equipment	31.00
809	Depreciation Adjustment	1.72
810	Other Maintenance Expenses	.06
811	Repairs Charged to Reserves—Cr.	
	Total Maintenance	53.80
	II. Traffic Expenses.	
820	Central Office Superintendence	2.21
824	Operators' Wages	13.49
825	Office Supplies & Expenses	.58
832	Pay Station Expenses	.60
833	Other Traffic Expenses	1.20
	Total Traffic	18.08
	III. Commercial Expenses.	
840	Commercial Administration	
841	Promotion Expenses	2.46
845	Collection Expenses	5.23
849	Directory Expenses	.68
850	Other Commercial Expenses	.53
	Total Commercial	8.90
	IV. General and Miscellaneous Expenses.	
860	General Office Salaries	3.62
863	General Office Supplies & Expenses	.07
867	General Law Expenses	1.20
868	Insurance	.49
869	Accidents and Damages	.09
870	Law Expenses Connected with Damages	
871	Miscellaneous General Expenses	1.58
	Total General and Miscellaneous	7.05
	Other Operating Expenses Considered as Deductions from Income.	
524	Rent Deductions for Conduits, Poles & other Supports	.03
523	[3]Rent Deductions for Telephone Offices	.81
525	Rent Deductions for Instruments & Equipment	5.82
523	[3]Rent Deductions for Telephone Offices	.05
505	Taxes	5.46
	Total Operating Expenses Considered as Deductions from Income	12.17
	Grand Total	100.00

Account No.	*Suggested Rearrangement Interstate Commerce Commission Classification* Class B.	Per cent analysis.
	I. Central Office Expenses.	
820	Central Office Superintendence	2.21
824	Operators Wages	13.49
833	Other Traffic Expenses	1.20
849	Directory Expenses	.68
825	Office Supplies & Expenses	.58
523	Rent Central Office	.81
804	Repairs of Central Office Equipment	3.92
	Total Central Office	22.89
	II. Transmission Expenses.	
802-3	Wire Plant Operation	(1) 6.12
802	Repairs of Aerial Plant	
803	Repairs of Underground Plant	.44
524	Rent Conduits Pole and Roof Privileges	.03
	Total Wire Plant	6.59
	III. Sub-Station Expenses.	
807	Station Removals and Changes	(2)6.17
832	Pay Station Expenses	.60
525	Rent Sub-station Equipment	5.82
805	Repairs of Sub-station Equipment	3.94
	Total Sub-station	16.53
	IV. Commercial Expenses.	
840	Commercial Administration	
841	Promotion Expenses	2.46
845	Collection Expenses	5.23
850	Other Commercial Expenses	.53
	Total Commercial	8.22
	V. General Expenses.	
860	General Office Salaries	3.62
863	General Office Supplies & Expenses	.07
867	General Law Expenses	1.20
871	Miscellaneous General Expenses	1.58
868	Insurance	.49
523	Rent General Office	.05
869	Accidents and Damages	.09
806	Repairs of Buildings & Grounds	.43
810	Other Maintenance Expenses	.06
	Total General	7.59
	Other Operating Expenses.	
808	Depreciation of Plant & Equipment	31.00
809	Depreciation Adjustment	1.72
505	Taxes	5.46
	Total Other Operating Expenses	38.18
	Grand Total	100.00

[1] 1.75% Operating Labor. [2] 5.59% Operating Labor. [3] 523 Divided into general office and central office rents.

Percentage Analysis of Total Operating Cost, Class B Companies, Based on Wisconsin Bell Reports to Commission.

Commission, commented upon the tentative electric railway classification as follows:

"In the first place, as to "maintenance," we have the maintaining of the property and the preparation of it for the conduct of transportation. The unit which the public applies generally to maintenance expenses is your miles of road and the general characteristics of the line. Then you have the equipment expenses, which really should represent the cost of maintaining the revenue equipment. This line that has been drawn by the accounting officers of America is a line which has put the work equipment over into maintenance of way expenses rather than in the maintenance of equipment expenses, because the result of that has been that maintenance of equipment expenses now, in their classification, represents the maintenance of revenue equipment, eliminating the work equipment. It is the following of that line of philosophy that has put work equipment into maintenance of way expenses." (p. 139.)

I have shown you that it is following the lead of that thought, that while you are removing the snow and ice you are not transporting freight and passengers and that has been, I believe, the governing influence which caused the gentlemen who framed the steam road classification to place that among the maintenance expenses. The same thing applies to 'cleaning and sanding tracks,' as they are very much of the same nature.

(*Continued on page* 616.)

Queries on Theory and Practice

Method of Testing With a Voltmeter.

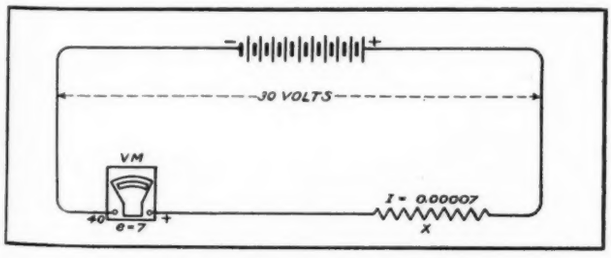
"What is the current method of testing with a voltmeter? It is said to be easier and more simple to use than the usual formula which is given for finding the resistance of a line by the voltmeter and battery. I would like to know how to figure by this new way."

The method to which you refer is most easily used with voltmeter whose resistance is some figure like 1,000, 10,000, 100,000 ohms, etc. A concrete example will show how it works. Keep in mind that Ohm's law is still the basis.

Suppose that a voltmeter is in series with the unknown resistance, X, and the battery, as shown in the diagram. Let the resistance of the instrument be 100,000 ohms. Then, if there is a pressure of one volt at the voltmeter terminals, the needle will point to one volt on the scale and the current flowing through the meter will be $\frac{1}{100,000}$ of of an ampere, or 0.00001 ampere. This much current will flow for every volt indicated by the needle. If it indicates 5 volts, the current will be 0.00005 ampere. This little fact converts the voltmeter into an ammeter for the purposes of the test.

Suppose the battery voltage, 30 volts, is first measured. Then put the voltmeter in series with the unknown, X, and notice the deflection, say 7 volts. Get the current flow by multiplying the voltage, 7, by the factor, 0.00001, which gives 0.00007 ampere. Now the resistance of any circuit is found by dividing the voltage by the current. In this case 30 volts are applied to a circuit through which 0.00007 ampere is flowing.

Substituting in the formula $R = \frac{E}{I} = \frac{30}{0.00007} = 428,571$ ohms. Call it 428,600 ohms. But this includes the voltmeter. Subtract 100,000 ohms, which leaves 328,600 ohms



Circuit for Testing with Voltmeter.

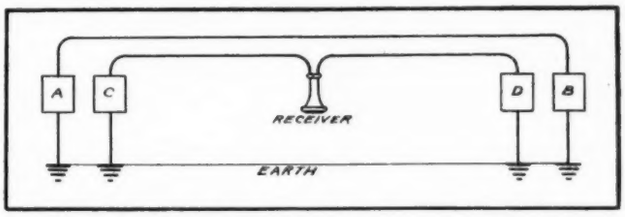
as the resistance of X. Reduced to a formula we have $X = \frac{E}{I} - r$ where r = the voltmeter resistance.

Cross Talk Due to Electrostatic Induction.

"I would like a little help on some of the elementary principles of telephony. Is cross talk always made by static induction and can you prove it by the Carty experiments? I tried it and failed, even at the middle of two grounded lines there was cross talk, but not so loud as at the ends. The telephones were magneto, 6-bar generators, 1,600-ohm ringers and good talkers. I had four of them, two on each line, as in the Carty experiments. Why didn't it come out the same way?"

Your failure to reproduce the results obtained by J. J. Carty is doubtless due to the greater strength of the telephones which you used. Mr. Carty read his paper on cross talk before the American Institute of Electrical Engineers in 1891, since which time the telephone has increased wonderfully in power. He used a Blake transmitter, which, although very clear within certain limits, was weak compared with present standards.

Cross talk is due to electromagnetic induction and to electrostatic induction, both effects contributing to the



Typical Circuit for Performing Carty Experiment.

result. His experiments proved that for the apparatus which he used, the static effect predominated and the magnetic effect was practically nothing.

The illustration shows the most typical of the circuits which he used, and which doubtless you duplicated. Telephones A and B are connected to the upper line and C and D to the lower line. If one talks into telephone A, the sound can be heard very distinctly in C and D, if the lines are close enough together. If, at the middle point of the lower line, a receiver is inserted in series, it will get none of the statically induced current. This is because the latter divides and flows each way to ground through the end telephones, C and D.

The current which is induced by the electromagnetism of the current in the upper wire traverses the entire length of the lower wire and will be heard by the series telephone at the middle point. Modern local battery telephones, when equipped with fresh dry cells are "good talkers" and on a short test line will produce a very noticeable magnetic induction. Under the conditions of your test, you have a very strong current in the upper line and this made the magnetic induction strong enough to be heard in the series receiver at the middle point. If you had tried the test of cutting off the B telephone and leaving the line open at that end, it would have shown up better.

Developing a Good Telephone Voice.

"What constitutes a good telephone voice? I want to be heard easily over the telephone so as not to annoy my prospective customers by endless repeatings and misunderstandings. How can I develop a good voice?"

The first and most important thing is to avoid hurry. Do not speak too rapidly. If you have been accustomed to tripping your words off at high speed, your effort to speak more slowly will at first seem labored and painful. But the more you practice it, the easier it will become and the more natural will be the effect produced on the hearer.

Do not let go of each syllable too quickly. Hang onto it long enough to complete it distinctly, yet not long enough to give the effect of a drawl.

Space your words apart so that the listener can get them as separate words, not a long succession of sounds. This is especially necessary in the case of words which may be unusual to the listener. If you are introducing a new idea to your man, he may not readily catch every word unless you assist him by enunciating each with a little more care than usual.

In the Rural Line Districts

Dr. J. R. Cary, the eyesight specialist, has purchased the Leoti telephone system and took possession yesterday.—Scott City (Kansas) Republican.

Frank Darling has bought a share in the Bell Telephone Co. and as soon as he can have a telephone put in and secure a "butting in" license, he will be prepared to talk whenever he wants to.—Fairview Correspondence Central City (Neb.) Republican.

Will Walker has traded his farm near King's river bridge to John Walker for the latter's interest in the Berryville Telephone Co.—Eureka Springs (Ark.) Flashlight.

The people of Wales who are on the direct telephone line with Memphis were summoned to that place Sunday morning to assist in extinguishing the fire which threatened the whole village for a time.—Wales Item Port Huron (Minn.) Times.

The directors of the farmers' phone system at Queen City at their meeting last week raised the service price from forty cents to one dollar a month which has raised quite a little music in the air. And as a result many are discarding their phones.—Kirksville (Mo.) Journal.

Our new telephone line is building as fast as possible, and will soon be ready for the news.—Bard Item Gladwin (Mich.) Record.

The telephone line north and east of town is being repaired—new and larger poles put in. The holes are being dug with dynamite, and every little while a shot can be heard here in town.—Pringhar (Ia.) Bell.

Since he recently obtained possession of the local telephone line, H. F. Mercord has been spending much of his time testing and repairing the lines to improve the service.—Prescott (Wis.) Tribune.

The Carlinville Telephone Co. has added to the convenience and safety of the town by placing an alarm gong on a telephone pole near the central office. If anyone calls for the police in the night on account of any disturbance or fire, a central girl will ring the gong for the police. It will ring loud enough for the police to hear it anywhere on their beat in the business part of town.—Carlinville (Ill.) Enquirer.

The telephone company is putting a new line between here and Randolph with a copper wire. The crew has been camped west of the Omaha depot the past week or two, and Friday night the water ran into their tents, necessitating their getting up at 3 o'clock in the morning and going to a hotel.—Laurel (Neb.) Advance.

Lightning played a rather freakish trick on the Sanborn Telephone Co.'s line, west of town, Sunday morning. It struck the line near the Chas. Schwanke place and melted two wires. Not a pole was damaged and there were six wires on the line but just two of them were hit.—Sanborn (Minn.) Sentinel.

NUTHIN' DOIN' IN LOCALS JIM THE BLAMED PHONE 'S OUT O' ORDER. * ! * ! *
THE BOYS WANTS COPY
OH HUM!
COW DIED - EH ? - YES - YES - GO ON - OH ! - COW HIDE - YES - YEP - YEP - PAPER WILL BE OUT OK. —
COPY BOY !
BACK IN A MINUTE BOSS !
HE'S WORKIN' US TO DEATH
COPY
COPY
Henning

It looked for a while as though the Briggsdale Banner would not be able to get out a paper this week because the phone was out of commission for two days and consequently there was little news that came in over the wire. During the thunder storm the Banner office was struck by lightning and the telephone connections were burned. Now that the wires are repaired, there is little worry in this district for the farmers will get their paper Friday.—Briggsdale Item in Sterling (Colo.) Advocate.

You wouldn't put your money in the bank if it simply paid interest for a number of years and the capital itself disappeared.
That's what happens when you buy galvanized ground rods for they soon rust and have to be replaced.

Copper Clad Ground Rods Do Not Rust.

Isn't it good judgment to make your investment permanent by installing such a rod?
For the telephone field we're making special size ground rods at the following prices:

	Weight per 100 Rods.	Cost per 100 Rods.
3-8 inch x 5 feet	200 pounds	$20.00
3-8 inch x 6 feet	240 pounds	24.00
3-8 inch x 7 feet	280 pounds	28.00

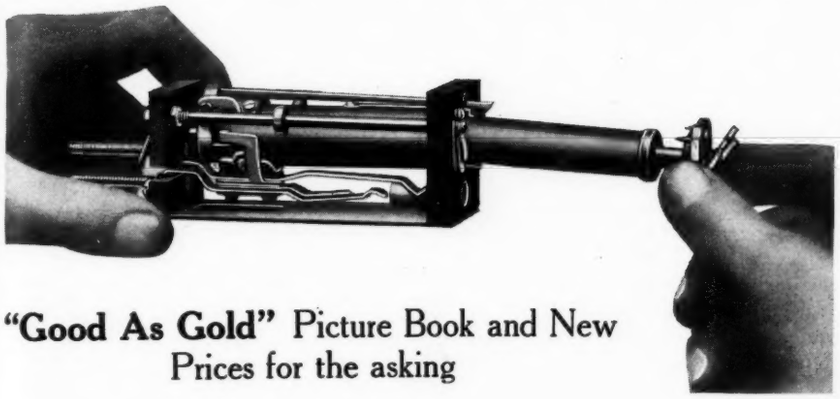
Shipment the day we get your order.

TRADE-MARK "WELD CLAD"

DUPLEX METALS COMPANY

CHICAGO OFFICE 853 Peoples Gas Building — Chester, Pennsylvania — NEW YORK OFFICE 30 Church Street.

"SWEDISH-AMERICAN" is the answer to your question of QUALITY



"Good As Gold" Picture Book and New Prices for the asking

The only Magneto Switchboard having **Self-contained** Drop and Jack with removable coil from the **front.**

In future **CANADA TRADE** will be supplied **direct** from **Chicago**

The SWEDISH-AMERICAN TELEPHONE CO. is no longer associated with the DOMINION TELEPHONE MFG. CO.

"Hercules" Telephones have stood the test of time.
Don't be fooled or misled by offers of second-hand Drops.
Deal **direct** with **headquarters** and get the latest **improved** kind.

SWEDISH-AMERICAN TELEPHONE MFG. CO.

5235 E. Ravenswood Park, CHICAGO, ILL.

COMMENT ON INTERSTATE ACCOUNTING PLAN.

(*Continued from page* 612.)

At the same time I would like to have you understand the governing line between the two classes of expenses. While you are cleaning track and while you are removing snow and ice, you are not producing revenue in that particular act, you are not hauling freight or passengers, and you cannot measure the efficiency of your effort in any sort of results that may be ascertainable, because you may have a great deal of snow and ice to remove and very few passengers to haul on that particular day or that particular month or any period of time, and the transportation expenses really should be measured in efficiency by the results of operation." (p. 144, Proceedings, A. S. & I. Ry. A. 1907.)

It will be noted that the principle suggested by Mr. Balch of grouping maintenance items so as to procure a unit cost such as per mile of road does not apply to telephone maintenance, unless the segregation is made between central office plant and exchange plant. As regards the second reason, viz., confining the purpose of "traffic" expenditures to *revenue producing* costs and placing expenditures of *preparation for traffic*, such as removal of snow and ice, and cleaning and sanding track in "maintenance," it is difficult to see how the resulting "traffic" cost is a practical measure of efficiency. The broad application of such a rule to cost accounting would prove disabling. In the electric railway business, carried to its logical conclusion, it would include dead car mileage, clearly a transportation cost. In a manufacturing establishment it would include the banking of boilers, the setting up of machines and other stand-by losses, an undue proportion of which is clearly a measure of inefficiency which few managers would consent to merge with maintenance of property. A knowledge of what separate proportion of the dollar expended is revenue producing, is no measure of efficiency, unless it is clearly shown whether its counterpart has been expended in dividends and upkeep or dissipated as a stand-by loss.

Any examination of operating expense forms accepted as the best accounting practice for various undertakings must lead to the conclusion that there is no generally recognized philosophy of accounts underlying the separation and grouping of expense items. In the balance sheet form certain features have become generally standardized in response to the needs of the investor and the appraisor of credits. In the income account statement, of which the total operating cost is an integral part, the arrangement has been generally shaped to disclose successive claims against current income and the resulting net income available for the distribution of profit. The form of operating expense statement, however, has been dictated largely by the needs for analysis on the part of the management or investigator as to the source and disposal of operating costs. So long as the information desired is not involved and will not necessitate elaborate bookkeeping procedure, the choice of a particular grouping of separate labor, material and expense charges is optional. The request for a primary expense grouping which does not follow the traditional form of the railroad and electric operating expense statement is based upon a vital need for specific information upon the part of a regulating body.

IV. Rent.

The classification provides that "rent for lease of other telephone plants" 522, "rent for telephone offices" 523, "rent for conduits, poles, and other supports" 524, and "rent for instruments and equipment" 525, are deductions from income rather than operating expenses. The theory upon which these accounts are so placed is evidently that rent is analogous to interest and hence is properly cared for after net income from operation has been determined, and that since rents received from other companies are properly classed as non-operating income, to include rent payments as operating expense will result in duplications when the reports of separate companies are compiled. This view is one upon which accountants have differed and which up to this time has not generally found its way into uniform classifications of accounts.

Rent of telephone plant may be grouped for convenience into four classes:

1. Buildings and real estate may be leased for the housing of the exchange, the general office, the store room, stable and garage, etc. Such leases may or may not include maintenance, heating, water, light and janitor service.
2. Transmission line units such as conduit, pole line equipment, and wire circuits are commonly leased to outside parties, for private detective, fire alarm, police service, etc., purposes, maintenance expense usually being borne by the lessor company. Similarly conduits, poles, and roof privileges are rented from outside parties, maintenance being borne by either party.
3. Subscriber equipment, such as instruments and similar equipment, may be leased by users or other companies. Such a lease may take the form of a contract between two companies whereby the lessee agrees to maintain and is granted the use of patents and instruments at a fixed price or for a stipulated proportion of gross earnings, or may consist of a regular lease under which maintenance may or may not be undertaken by the lessor company.
4. Entire telephone plants may be leased under operating agreement.

The principal objection offered to the proposed procedure is that rent cost, like maintenance cost, must be associated with specific operating processes in order to secure complete data as to the cost of producing service necessary for a determination of reasonable rates.

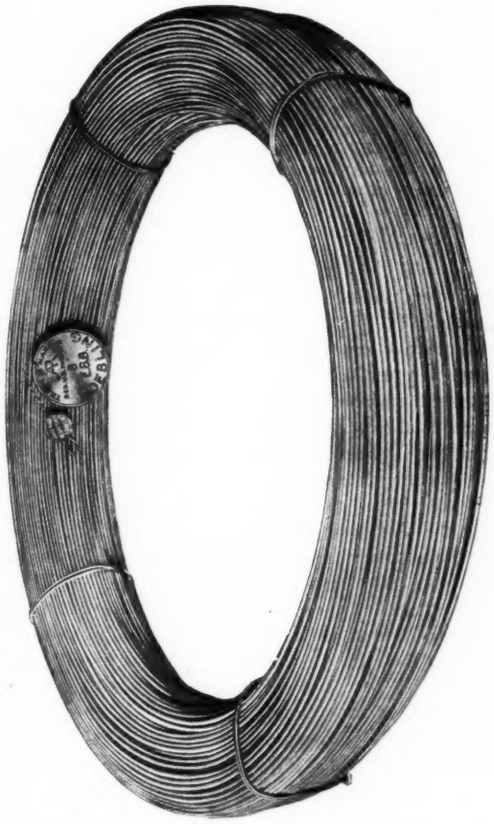
A second objection is that the rental agreement in practice embraces costs of operation and maintenance which cannot be differentiated from what is pure rent with any degree of accuracy. An attempt at such a separation results in the introduction of arbitrary accounting approximations which invalidate the usefulness of the classification for purposes of comparison, and which may involve separate investigations as to the reasonableness of company's rule of division in a rate case.

In a partial endeavor to meet these practical objections, the proposed classification has not been consistent in its treatment of rents.

Thus, rents paid or payable for telephone offices (523) are treated as a deduction from "gross income." The following exceptions are, however, provided:

"Where rent payments cover services, light, heat, etc., and maintenance, in addition to a return upon investment, an apportionment should be made of the rent payment and the amount, representing interest and maintenance (estimated if not known) should be charged to this account, the balance of the payment being charged to the appropriate expense accounts. Where repairs of rented buildings are made by the company, the cost of such repairs, should be charged to the appropriate operating expense or other accounts." (523.)

Rents accruing from buildings and other property "when such property is used also by the (lessor) company and the expense of maintaining and operating the rented portion cannot be separated from the total expense" (724) are treated as "miscellaneous operating revenues." Where, however, such rent expense can be separated the rental accruing is evidently credited to "miscellaneous rent revenues" (507) as an addition to "non-operating income" and the expense of maintenance, excluding taxes, is charged to "rent expense" (515), under "non-operating revenue deductions." Taxes paid upon property leased is evidently



EVERY PROCESS

of the manufacture of **Roebling Double Galvanized Telephone Wire** is conducted with one end in view —to produce durable, uniform wire of high conductivity.

The metals used are carefully selected, subjected to exacting tests to prove their quality, and **protected** against rust by real galvanizing.

John A. Roebling's Sons Co.

TRENTON, N. J.

We make also Hard Drawn Copper and Copper Clad Steel Wire, Wire Strand and Telephone Cables.

For the many advantages of simplicity—
Warner Pole Changers

Any part of the apparatus may be withdrawn for inspection or test without interfering with the operation of the Warner Pole Changer.

Not a single unnecessary part.

All parts are contained in a handsome, durable, seasoned oak cabinet.

The Warner Pole Changer uses current from power battery only when signalling.

All parts subject to wear are easily replaced so the Warner Pole Changer is practically everlasting.

There are 16,000 Warner Pole Changers in use and every owner is getting satisfactory and inexpensive ringing power.

Perhaps we can show you a way to get better ringing at less cost—write and see.

Warner Electric Company
Muncie, Indiana

to be separately charged to "non-operating taxes" (520) under "non-operating revenue deductions."

Similarly rents paid or payable for "conduits, poles and other supoprts" (524) are treated as a deduction from "gross income," while rents derived from attachments to exchange poles, the use of conduits, and other minor rents from exchange (or toll) plant "where such property is maintained by the accounting company, and the cost of such maintenance cannot be separated from the expense of maintaining the rented property" are included as "exchange" or "toll service operating revenues," as the case may be. No provision is made for the separation of the maintenance portion as distinct from the pure rent charge in (524) "rent deductions for conduits, poles, and other supports" such as is provided in (523) "rent deductions for telephone offices," although in rent of conduit and joint poles, maintenance is frequently borne by the lessor company.

Similarly rents paid or payable for "instruments and equipment" (525) are treated as a deduction from "gross income," while all revenues derived from "telephone lines, equipment and instruments forming part of company's plant and leased to others for use as private lines" are included in "exchange" or "toll operating revenues," as the case may be. Here, again, the rent payment (525) frequently covers the cost of maintenance where such cost is borne by the lessor.

It will be noted that inconsistencies are developed in the above procedure in that (1) all rents are not uniformly treated as additions and deductions to income, thus preventing an effective clearing of the slate in a statistical statement grouping all lessor and lessee company transactions, (2) the rule as to separation of pure rent from operating cost considerations embraced in the rental agreement is not consistently adhered to, since such a separation is provided for rent of buildings and not for rent of other equipment.

As illustration of the practical difficulties which are likely to occur if a separation of pure rent as distinct from operating cost considerations is insisted upon for telephone companies, references is made to the large amount of controversy involved in similar separations provided for "hire of equipment," "joint facilities," and miscellaneous rentals" in the steam road classification. This is particularly objectionable since the administration of accounting requirements will devolve principally upon the state commission, and since telephone companies are more limited in average gross earnings and accounting facilities than the steam roads. It is suggested that a preferable procedure is to provide debit and credit entries for intercorporate payments similar in form to "licensee revenue" (726, 727) for the lease under operating agreements of entire telephone plants, listed in our classification of rents as (4); to include rents of buildings and real estate listed as (1) under clearing accounts (907) "house service expense," already including fuel, heat, light, power, elevator, janitor service and like expenses, such account to be cleared by charge to central office, stores department, etc.; and to include all rent accruals for equipment listed as (2) and (3) as "operating revenue" and all rent payments as specific operating expenses. Such a procedure will obviate ultimate complications, will permit consolidation of reports for statistical summary and will follow the intent if not the letter of previous practice. See exceptions already made to the procedure relating to rent in Classification of Operating Expenses for Steam Roads (3d issue 1908) 21, 41, 60, 61, 63 and 86).

Apart from these practical objections question may be raised as to the theoretical basis upon which rents are made a deduction from income rather than a part of operating expenses.

Cost accounts generally include rents as part of operating cost.

Webner, Factory Costs: "It is very obvious that rent of factory buildings and interest on money invested in factory and for manufacturing purposes must appear in some way in the cost of conducting the business, whether they be regarded as production costs or as a division of profits. From the practical standpoint any cost necessarily incurred in the production of goods is most conveniently and most safely included in production costs." (p. 155.) (See also Hawkins "Cost Accounts," p. 109, Stanley Garry "Multiple Cost Accounts," p. 45-47. Church "Production Factors," 88 ff.)

Published accounting statements of the financial and operating returns of public utilities are required in England under the various water, gas and electric acts. (Water works clauses consolidation act of 1847, the electric lighting act of 1882 and 1899, and the gas works clauses act of 1871.) These statements are prepared annually and are certified to by regular chartered accountants. From the examination of the procedure prescribed in British text books in drawing off these statements, it is noted that in every instance rents are included as a portion of the revenue account and that only such items as interest, bank charges and income tax are included as charges to the "Profit and Loss" or the "Net Revenue" account. (John H. Brearley and Benjamin Taylor, F. I. P. S.: "Gas Companies Bookkeeping," London, 1906. See model revenue and profit and loss account, 146-147; the Accountants' Library, "Gas Accounts," by the editor, London, 1905. See model revenue accounts statement and model profit and loss account or net revenue account, 82, 84; McColl: "Tramway Bookkeeping and Accounting." The Accountants' Library, London, 1902. See model revenue account, 5, 6, 7; Frank McKey, A. S. A. A.: "Water Company Accounts," London, 1903. See model revenue account, page 49; George Johnson, F. S. S., F. C. I. S., etc.: "Electric Light Accounts," London, 1904. See model revenue account, 104.)

It is of interest to note that in the electric and gas treatises cited, rents, rates and taxes are treated as a primary expense account and are given precedence in the statement to management expenses.

(To be continued.)

Telephone a Cause of Insanity.

Dr. Strauch, a mental specialist, of Berlin, Germany, has discovered a new disease which he calls telephone nervousness, says a cable dispatch. A prominent Berlin attorney had been in continual conflict with the postoffice for more than a year regarding his telephone. Several times he was prosecuted on the charge of insulting the telephone girl, and finally his telephone connection was cut off.

The attorney immediately began proceedings for its restoration. The postoffice department offered as a defense that the attorney was continually insulting officials.

Dr. Strauch was called as an expert and testified that telephone nervousness is a serious ailment. The telephone, he said, acts on certain persons like poison. He continued:

"I know a case in my personal practice of a physician who was so worked up by delays and other unpleasant occurrences that he became permanently insane. Excitable persons should never use the telephone."

The court was so impressed that it adjourned the case in order to enable Dr. Strauch to submit further instances of the disease and observations as to its effect.

From which we must conclude either that the Germans, hitherto considered a rather phlegmatic race, are as wildly excitable as are the French, or else that the German telephone service is not all that might be desired by the great telephone using public.

No. 2
28 inches high. 6 lbs. of gas.

Soda Water Gas Puts OUT Fires

It puts out fires because it contains no FREE oxygen and being heavier than air displaces air. Fire can't live without the oxygen in air.

It is a harmless gas, odorless and non-corrosive. In fact, it is the same chemically as the breath you exhale, except that even a baby's breath contains decayed animal impurities, while carbon gas is pure.

The Diamond Liquid Carbonic Fire Extinguisher

is a heavy steel tank filled with Liquid Carbonic Gas and fitted with hose and coupling. We build this tank in two sizes:

No. 1, 20½ inches high, round bottom. Holds 4 lbs. of Liquid Carbonic Gas. Complete with hose and couplings, F. O. B. Liquid Branches.....$12.50
No. 2, 28 inches high, flat bottom. Holds 6 lbs. of Liquid Carbonic Gas. Complete with hose and couplings, F. O. B. Liquid Branches..... 15.00
Refills, at any of the Liquid Carbonic Co.'s branches:
No. 1, each..... .75
No. 2, each..... 1.00

Either size is easily portable so that a girl can pick it up, and while holding it with one hand can open the valve and direct the nozzle with the other.

In a jiffy the fire is out and the gas leaves no traces in its wake; in other words, by the use of this gas system you avoid the expensive delay due to the slow process of using blankets or sand tubes. You avoid the damage done by the corrosive chemicals used in chemical extinguishers and you insure the speediest possible resumption of service.

Send to our nearest branch for booklet.

20½ inches high. 4 lbs. of gas.

BUILT BY

"The Liquid" Carbonic Company

JACOB BAUR Pres. and Treas.

CHICAGO New York Boston Pittsburg Cincinnati Milwaukee Minneapolis Atlanta St. Louis Kansas City Dallas San Francisco

W&M TELEPHONE WIRE

OUR W. & M. Telephone Wire is drawn from metal made especially for the purpose and rigidly inspected. The spelter is carefully laid on with uniform thickness, ensuring ample protection for the wire under extreme weather conditions.

In point of conductivity this good wire has attained the highest possibilities and we submit our three brands—"E. B. B." "B. B." and "Steel"—as the best that can be produced.

"W. & M. Telephone Wire News," a publication describing telephone wire in practical use, furnished free upon application.

We Make

American Wire Rope
Aeroplane Wire and Strand
Piano Wire
Mattress Wire
Weaving Wire
Broom Wire
Fence Wire
Flat Wire
Flat Cold Rolled Steel
Wire Hoops
Electrical Wires and Cables
Rail Bonds
Bale Ties, Tacks, Nails, Staples, Spikes
Barbed Wire
Woven Wire Fencing
Fence Gates
Steel Fence Posts
Concrete Reinforcement
Springs
Sulphate of Iron
Poultry Netting
Wire Rods
Juniata Horse Shoes and Calks
Shafting Cold Drawn Steel
Wire of Every Description

We issue separate catalog for each of these, gladly furnished upon application.

American Steel & Wire Co.'s Sales Offices

CHICAGO 72 West Adams Street
NEW YORK 30 Church Street
WORCESTER 94 Grove Street
BOSTON 120 Franklin Street
PITTSBURG Arrott Building
CINCINNATI Union Trust Building
CLEVELAND Western Reserve Bldg.
DETROIT Ford Building
ST. LOUIS Third Nat'l Bank Bldg.
MONTREAL Bank of Ottawa Bldg.
ST. PAUL-MINNEAPOLIS Pioneer Building, St. Paul
DENVER First Nat'l Bank Bldg.
SALT LAKE CITY 736 South 3rd West Street
SAN FRANCISCO 16th & Folsom Sts.
PORTLAND Ninth & Irving Sts.
SEATTLE 4th Ave., S. & Conn. St.
LOS ANGELES Jackson & Central Avenues
NEW YORK United States Steel Products Co., 30 Church St.
Export Representatives

Practical Telephony for the Practical Exchange Manager

The Fifth Installment of a Series of Articles Relating to the Management and Operation of a Moderate Size Exchange—Another Circuit for Special Farm Line Service—Organization and Equipment of the Line Construction Crew

By H. R. Van Deventer

There are several other schemes for giving this kind of rural line service. One of these is shown in Fig. 5. With this arrangement, when the button is pushed, the generator delivers a pulsating current to the line while normally the current is alternating.

The central office equipment consists of a device responsive to pulsating current only. This arrangement

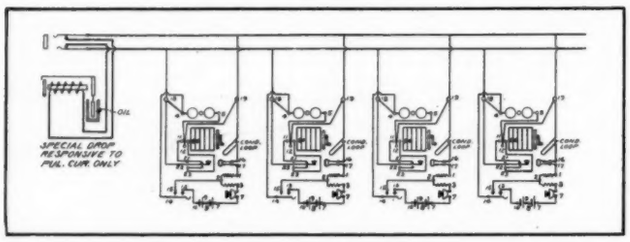


Fig. 5. Special Service Circuit Using Alternating and Pulsating Current.

eliminates any ground on the line. While several devices responsive to pulsating, and not alternating current have been offered, few of these have come into extensive use. Nearly all of them require careful adjustment and seem to be particularly susceptible to changes in the resistance of the line and other factors beyond control. This system is therefore not recommended where the standard push button systems using the grounded drop can be employed. These differences in the equipment of course make no difference when planning a new installation. The point it is desired to bring out is that this class of apparatus has been fully developed and is now so perfect that the maintenance is no greater than with the use of ordinary telephones.

Those who have not been intimately connected with the manufacturing end of the telephone industry, can scarcely realize what a great change has taken place in the mechanical construction of equipment during the past few years. One can well remember when, a few years ago, many of the switch hooks offered were defective in some particular, with the result that "hook trouble" was a daily occurrence. It is now a rare thing to find hook trouble, except where a desk stand is sometimes upset and the hook actually broken off. So far as hook contact trouble is concerned, it does not now exist.

It is also well remembered when the transmitter seemed to be inherently defective. In every exchange men were busy locating packed transmitters, adjusting, polishing buttons or doing something else which called for expenditure of time. A packed transmitter is now rare. There are of course transmitters which go bad, but these usually actually wear out, due to corrosion of the aluminum diaphragm. Most of the modern makes now have the diaphragm covered with an enamel practically corrosive-proof, or some other material which prevents the ingress of moisture.

Many managers are afraid to adopt the push button and other special feature rural instruments because the sets are a little different from the accepted standard, and they fear trouble. No doubt the mechanical defects of some of the first push buttons caused trouble, hence this feeling. But these are like the hook switch and the transmitter—perfected.

In considering the initial layout, everything must be metallic from one end of the system to the other. If grounded lines already exist, they should be made metallic at once.

In an out of the way corner of the territory, the manager is often tempted to think, "Oh, well, anything will do." Better build right in the beginning. A grounded line service will not prove satisfactory.

Where the system is entirely metallic throughout, not only will the service be more satisfactory, but many special kinds of service can be given, thus enabling a large volume of traffic to be handled with a minimum of equipment. To build metallic costs but little more; it is not double the cost of single lines, a mistake often made by the hasty calculator.

One hears of a certain manager as being an "experienced telephone man." His efficiency depends upon his experience. How did he get his experience? Why by years of operating, years of managing practical telephone properties, and by carefully remembering his "experiences." Now a man with much less experience could hope for almost as much success, if he could avail himself of the knowledge possessed by others in the field.

It is regrettable that, in spite of the size and importance of the telephone industry and the 80,000 men engaged in it, there is no representative engineering body composed of telephone men. Every other branch of electrical science has some society with its related journal, where information is disseminated.

The want of such an organization has often been expressed, but everyone seems to be too busy to start it. Were it not for the telephone papers, those engaged in telephony would be wholly without information as to the progress made in the art. There are in various parts of the United States many schemes in use. Some of these are particularly desirable and could be used to great advantage everywhere. Some of these methods are doubtless revolutionary in their character. But telephone men are too busy to interchange this information. The new

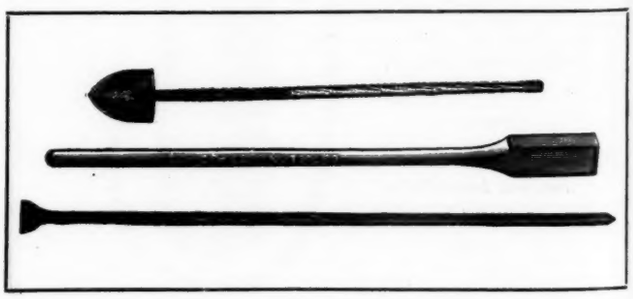


Fig. 6. Some of the Groundman's Tools.

comer should therefore ask questions, go after information as to methods and apparatus, study, tabulate, consult. No one in the field will refuse to give information. Telephone men are proverbially "good hearted."

It is true much valuable information may be obtained

Underground

CONDUIT SYSTEMS

our specialty

WORK STARTED
AT ANY POINT
WITHIN 48 HOURS

Write us for estimate

G. M. GEST

Engineer—Contractor

Executive Office
277 Broadway, New York

Cincinnati
Chicago

San Francisco
Montreal

Telephone Wires, Cables & Cable Accessories

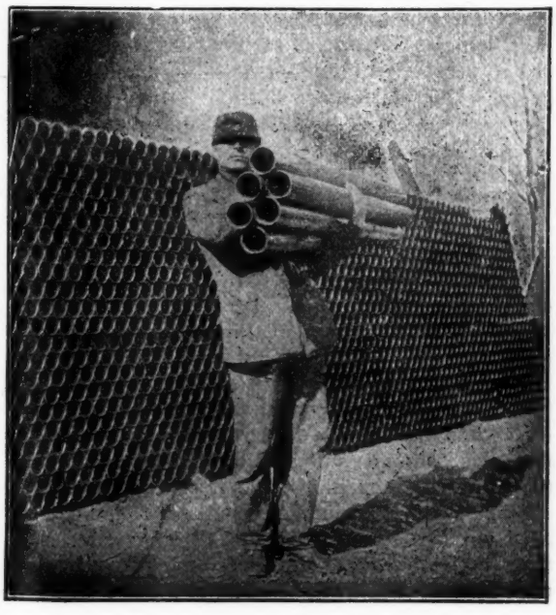
Everything in
ELECTRICAL
CONDUCTORS

Standard Underground Cable Company

PITTSBURGH, PA.

Boston
New York
Philadelphia
Chicago
St. Louis
San Francisco

For Canada: Standard Underground Cable Co. of Canada, Ltd.
Hamilton, Ont.



Carrying 30 feet 3-inch socket joint conduit.

Orangeburg Fibre Conduit

("Admitted to be the best Fibre Conduit")

Made in FOUR STYLES OF JOINTS
Socket, Sleeve, Screw and Harrington
WITH BENDS AND FITTINGS FOR SAME

Is the lightest conduit made

and means low freight and cartage costs

Send for The Conduit Book

THE FIBRE CONDUIT COMPANY

103 Park Ave., New York
1741 Monadnock Bldg., Chicago
S. B. Condit, Jr., & Co., Boston, Mass.
Bryant Zinc Co., Chicago, Ill.

MAIN OFFICE AND FACTORY
Orangeburg, New York
McClary-Jemison Machinery Co., Birmingham, Ala.
Tri-Provincial Electrical Supply Co., Winnepeg, Can.

Pierson, Roeding & Co.,
San Francisco, Cal.
Los Angeles, Cal.
Seattle, Wash.
Salt Lake City, Utah.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

from the text books and the literature furnished by the manufacturing companies. It is also true that the cost data given in many of the text books is unreliable and in many instances estimates are entirely too high, especially for the average rural proposition.

In perhaps no other branch of engineering work is the existing published data so obsolete and in many cases so unreliable, as in connection with telephone construction costs. Estimates often given apply only to one state, or even a portion of the state. The efficiency of a crew, or the men composing it, is seldom stated, and there is no standard "day's work" by which to be guided.

In starting new work in a new territory, get cost data from the nearest operating company. This insures estimates being based on the local cost of labor, etc. In the majority of cases, the cost is considerably lower than that given by the text books, the data in which seems to have been compiled when labor was less skilled and construction more difficult on account of the lack of appliances and methods now available.

The following data as to construction gang colonization, equipment and costs, will be found applicable to the middle and southern states. It may be used as a basis upon which to estimate costs elsewhere, and as it is taken from practice, is reliable.

For setting 25-ft. poles in sandy or loamy soil, a first-class digging gang would be made up of one foreman (usually a lineman), and four laborers. Each man in the digging gang will need the following tools:

1 8-ft. digging bar.

1 long handled shovel.

In soft ground, a Utica hole digger or similar device will work faster than the shovel. In digging in swampy land, a small tin bucket tied to the end of a four-foot stick will be found handy for removing the water as it runs into the hole.

For stiff clay or rocky ground, two or three more men will be needed in the digging gang to keep ahead of the pikers. If cross arms are to be attached to the poles while on the ground, two more men with a wagon and material will be needed ahead of the piking gang.

One man working alone, will dig from 15 to 20 five-foot holes a day in dry, soft ground. In clay, rocks or mud

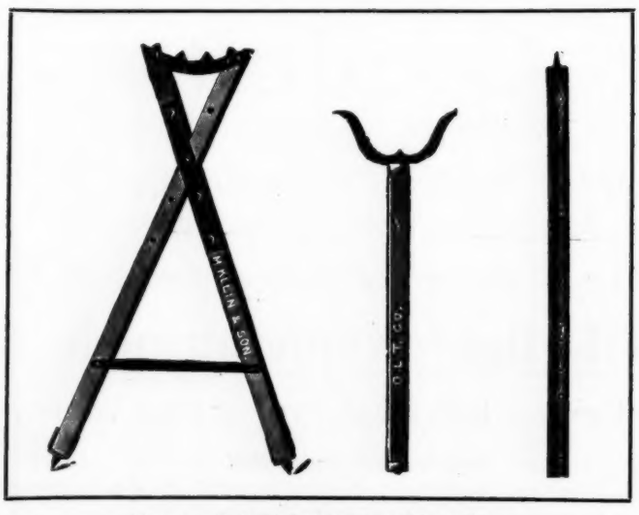


Fig. 7. Pole Supports and Pike Pole.

and water, he will be doing well to dig one-half or one-third of this number.

The piking gang usually consists of one foreman and four laborers. The tools for this gang are as follows:

Three 12-ft. pike poles, one 8-ft. support, one shovel, three tamping bars, one cant hook, two carrying hooks, one 1-in. x 6-in. x 6-ft. butt board.

The average gang will set from 30 to 50 poles per day, this depending in a measure upon the distance to be covered by the gang between morning and night. Where the gang has a camping outfit with it, the maximum number of poles will be set.

The "wire stringing gang" will need the following tools

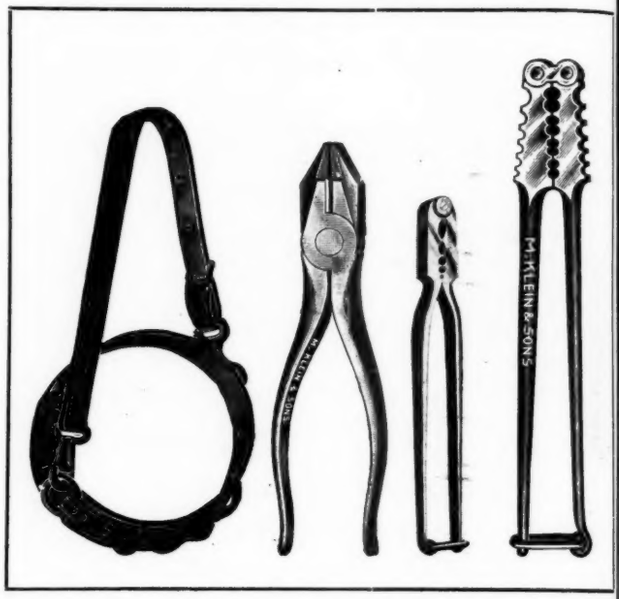


Fig. 8. The Limeman's Belt and Some of his Tools.

besides those which each lineman carries in his belt, to string two wires:

Two pay out reels, two four-inch double sheave pulley blocks with 100 feet of ½ in. manilla rope. The blocks and rope are used for pulling up the wires.

The "equalizer" consists of two Buffalo grips, one attached to each end of six feet of ½ in. manilla rope which passes through one four-inch single pulley block. In addition, it is well to have one long handled axe and a hand saw.

Each lineman should be supplied with the following tools:

One pair of climbers, one pair of 8-in. pliers, one pair connecting clamps, one 10-in. monkey wrench, and one short handle hand axe.

In stringing wires, three linemen, two laborers and one foreman should complete three miles of metallic circuit per day when a wagon can be driven along the line and the wires run off a pair of reels mounted on the wagon. This takes into consideration a reasonable amount of tree trimming. When the trimming to be done is excessive, this estimate will be considerably reduced.

In addition to the above gangs, there should be one general foreman or superintendent of construction who, assisted by the foreman of the digging gang, sets the locating stakes ahead of the gang and has general supervision.

The average cost of labor in the southern and middle portion of the United States will be about as follows: Laborers, $1.25 a day; lineman, $2.50 a day; general foreman, $3.50 to $4 a day.

Where possible, the territory should be divided up and several gangs employed. This enables the construction to progress simultaneously at several different points and the territory is covered much quicker than if the work proceeds from one point only.

(To Be Continued.)

Patent Pending

"Hy-Po-Stat"

The All Metal and Porcelain Cable Protection
This is the terminal that

"Protects Your Cables"

and makes your investment a permanent one.
For further information ask your jobber, or write

The Royal Electric Company
SIDNEY, OHIO

MILLIONS
Of Dry Cells
Are Handled In This Territory

FRENCH Telephone Cells

Are Manufactured and Shipped
Direct from Madison, Wis.

There is no reason why the dry cells *you* use should get old in transportation and stock rooms before you install them.

Your orders will be shipped the day received.

Send for new price schedule.

FRENCH BATTERY & CARBON CO.
Madison, Wis.

THE LATEST EDITION OF THE MOST POPULAR TELEPHONE BOOK

Telephonology

adapted as much to the needs of the man who is beginning at the ground to work up as it is indispensable to one who has already advanced to the position of wire chief, superintendent or manager and realizes that telephone work is so complicated and covers so broad a field that he must be seeking help for the solution of new problems every day. ¶ The new edition is brought completely up to date by the addition of chapters on "Railway Telephony" and "Recent Progress," including Major Squier's system of multiplex telephony, the Automanual system, Automatic systems, etc.; 650 pages, 18 chapters. and profusely illustrated. Telephonology makes a knowledge of telephone practice come easily to the reader.

$4.00 POSTPAID

Send for further particulars or order today.

TELEPHONY PUB. CO.
Monadnock Block
CHICAGO

TELEPHONE WIRE

We Guarantee
Greatest Efficiency
Longest Life
Most Satisfactory Service
Lowest Cost of Up-keep
In the Use of our wire.

Write for FREE SAMPLE
Make Test and Comparison

Approved by Leading Institutions of Technology and Telephonic Science. Handled by most representative Jobbers and Supply Houses.

Indiana Steel & Wire Co.
Muncie, Indiana.

Practical Subjects—Letters and Discussions

Letters From an Old Timer to the New Troubleman.

Mr. Troubleman,

Dear Friend:—You, without a doubt, know the meaning of "shorts" in speaking of a line that is in trouble, but are you acquainted with all the variations? They vary from a dead metallic short, having no resistance, up to a short having millions of ohms resistance. Every line has its measurement of resistance between the positive and negative wires. The farther the wires are apart and the better the insulation, the greater is the resistance.

An electrical current is not confined to the wires alone, as it has an influence on the space around them. This influence is due to what are known as lines of force and they are responsible for what is called induction. Induction means the carrying of sound or force from one circuit to another without a visible means of connection. For instance in the telephone induction coil your receiver gets no current except by induction. In this case induction is desirable, but there are other cases in telephone business that are far from being so. Go deeper into this induction business, it will do you good. I will go back to the every-day practical shorts.

You have, as a rule, nothing to do with any short that cannot be measured on the voltmeter. On a dead metallic line short, it is not much of a trick to walk over a line and find a couple of iron wires wrapped around each other. The trick comes in before you start on the trouble for you to decide by your deductions as to whether it is a metallic short on the line, a receiver off, or a battery or a high resistance short. I will give you some illustrations of different kind of shorts that I have had and which I think will help you more than a lot of general rules.

A line tested dead short. We could get some of the subscribers on the line, so knew that it was a high resistance short. I could talk plainly with the subscribers, so made up my mind that a receiver was off the hook somewhere or that a receiver hook was stuck. I examined the telephones on the line and found no receiver off or hook stuck. Then I began studying the line. There was no chance for a short on it so I went to a junction pole where the loops dropped off and opened one side of the loops in the tap splice. Putting them back one at a time I found the loop in which the trouble was located, traced it up to the telephone and found the trouble in the hook springs. The insulation between the springs of the primary circuit had become bad in some way causing battery to flow across. This threw a dead short on the transmitter, acting the same as a receiver off to the line, the secondary springs being open making no difference to the line. You will frequently find shorts of this kind in some makes of telephones.

Another short, in fact several of them I have found in wiring on the back of the telephone. If you get a short in a telephone with your primary and transmitter in circuit, it acts like a receiver off. The worst kind of a short you can get on a line is one about 10 or 15 per cent. of your battery. This will undoubtedly be in a loop the insulation of which has become worn by rubbing against a tree or something else which has got it in such bad shape that any storm or dampness on the wires will carry the battery from one wire to the other. A small short without a ground, you will generally find in the twisted drop or in a damp cellar. A small short with a ground you may look for in a tree or in any place where the current could get to ground. As a rule, the short is located where the ground is.

A heavy battery short I found in a cellar under a kitchen where water leaked down on the inside wires. This caused the insulation to rot and corrode so badly that we had to put in new wiring and run it so as to keep away from the dampness. It is not an unusual trouble and battery shorts of this kind are very frequently found in damp places in cellars.

Another one. A line tested 25 per cent. short. We could get all parties, and knew that there was poor insulation somewhere. There were four loops and telephones on the line. One loop ran into a cellar, so I went into it, took out the fuses and cleared the line. I put them back and looked over the inside wiring, which apparently was all right. Then I took the wires off the telephone and had the trouble just the same, so knew that it must be in the inside wiring. I examined every staple and found one which was corroded badly. I took this staple out and found wires wet and rotten underneath. After separating the wire the line was free from trouble.

Another one was a heavy high resistance short which I found in a cellar where the wires went through the floor. They had become water-soaked by cleaning the floors. The water that was used or rather the people that used it got careless and the consequence was that the frequent baths were too much for the wires. Don't put tape on your wires in damp places or places where it will be liable to get wet. Tape is a delusion and a snare. After a wetting of any kind, the wires will usually dry out. If you have tape on them, it may be a little protection for awhile, but I have yet to see the tape that won't absorb moisture, and keep it there to the certain destruction of whatever it was intended to protect. This applies to work that is exposed to dampness. Sometimes tape can be used to an advantage temporarily. For example, if a loop is worn badly, it can be split and each wire wrapped separately with tape, but this will only last for a short time. A short under almost any condition is one of the easiest troubles we have. You can always open either side of your line at any convenient test point and a test will tell you if the trouble is ahead or behind you.

In my next letter I will tell you something about "Noisy Lines."

Very truly yours,

Fred Dewey.

TO WIRE CHIEFS AND MAINTENANCE MEN.

Clearing of troubles which occur in your exchange, inside or outside, may be made the subject of short, practical letters which will interest other telephone men These* TELEPHONY *will gladly publish, if illustrated by diagrams or photographs. Simply write a description of the nature of the trouble, tests and location, cause found, and method of repair. Payment will be made for all letters published.

Accurate Measurements.

On September 5 the Chicago-Milwaukee underground circuit No. 30, tested open, says a writer in the Bell Telephone News. Upon further investigation it was found that the No. 67 conductor was open between Milwaukee and Kenosha. This is a distance of about 33 miles. There being no other trouble in the cable, former Cable Tester George Crowell, now in the engineering department, Milwaukee, was called upon. After a careful capacity test, he advised opening the cable at manhole No. 588, in the city of Milwaukee, as he believed

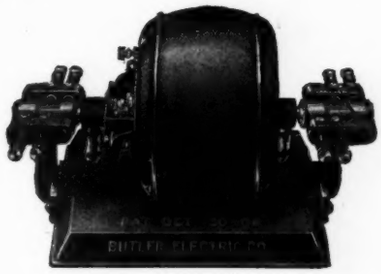
NO MAN EVER KICKS

when he is charged too little for the telephone toll service he buys; therefore the Manager's Office never learns how many "excess minutes" are used in toll conversations that are not paid for. None of these excess minutes ever get by

THE CALCULAGRAPH

and the increase in revenue directly due to its records of *elapsed time* are often enough to pay a dividend on the capital stock of the company. Ask for our booklet.

CALCULAGRAPH COMPANY
1416 Jewelers' Building NEW YORK CITY



100% Efficiency
That's what you get when you use a

Butler Ringing Machine

Built for

Alternating, Pulsating and Harmonic Systems. Installed on Trial.

Send for booklet or write us regarding special equipment

Butler Electric Company
PERRY, IOWA

Business Essays
Connected in Multiple-Series
Number Two

What Is the Other Reason?

There are only two reasons why a manufacturer will not guarantee his products. One of them sounds something like this: "We know our battery will make good." Strange to say, that is just why we do guarantee the Red Seal. Only goods good enough to guarantee can be guaranteed to make good.

Guarantee

We will *credit* account, *replace* batteries or *refund* amount paid for batteries including transportation charges if they do not prove satisfactory.

Manhattan Electrical Supply Co.
New York Chicago St. Louis

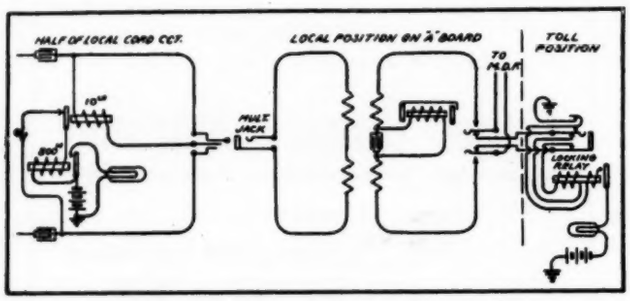
Please tell the Advertiser you saw his Announcement in TELEPHONY.

the trouble would be found very close to that point. This manhole was opened, the sleeve removed from the cable and an open wire was discovered in the loading coil.

As it is very seldom a trouble of this kind is located with sufficient accuracy to necessitate only one opening of the cable, this is considered a very fine case of locating trouble.

A Toll Switching Circuit.

Having had considerable experience with switching circuits the writer submits a circuit which he has designed and has used with success in one of the large Independent exchanges in the East. The circuit was designed for use



Circuit for Switching Toll Lines to Board Board.

in switching the lines coming into a toll board onto a local common battery board for use at night and Sundays. There is no operator on the toll board at these times and the local operators are thus enabled to take up the connections in the multiple of the local board.

Before the present arrangement was installed, the trunk lines were connected through double plugged cords to the local board. It often happened that the toll operators forgot to plug the lines through, and that was the main reason for the present circuit being installed. In the circuit here shown, switching keys are placed at the top of the board near the middle positon with the 1,000-ohm tubular drop directly over the key. The drop is of the single coil, iron clad type.

A repeating coil with four concentric windings with overlapped iron wire core is used. The proportion of windings by turns is one to one, thus permitting ringing and talking through it. The repeating coils were mounted on the racks in the terminal room. In the diagram one-half of the local cord circuit is shown so as to enable the reader to readily trace the circuit.

R. S. Bayley.

Some Experiences With Converters.

At one time we commenced to receive an increasing number of complaints that the bells would not ring at times. Upon inspection by the troubleman, they would be found to be all right. Studying these complaints, two facts became evident; one was that nearly all the bells were on a single frequency, and the other that nearly all the complaints were made in the morning during the same hours.

Trying out test bells, the converter appeared to be working satisfactorily. Once when we ran with the test cord connected, the reverse key was thrown and the ringing ceased. Reversing again the bell rang. Pushing in the continuous ringing key and reversing so that the test bell did not ring, we examined the bell. It was found to be buzzing and upon touching the clapper began ringing nicely. The frequency was right for there was no cross ringing. While looking for the trouble, the voltage of the storage cells, which were being charged, gradually rose and the trouble cleared up.

The next morning the bell rang the same way. In looking over the frequency which gave us the trouble, we noticed the motor spring looked rather heavy. It proved to be very stiff. Replacing it our difficulties were over. The stiffness of the spring, while permitting it to be adjusted to the proper frequency, would not allow the contacts sufficient time to pass the necessary current to pull the clapper over properly at all times.

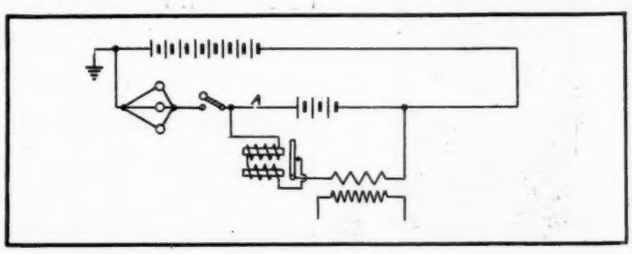
The experience gained through this difficulty proved useful soon after. The lowest frequency acted somewhat similar. It had to be adjusted very closely in order to get the proper vibration and then would spark viciously. Examining the vibrator, we discovered that the motor spring while not loose had not been screwed up tight, thus introducing a light resistance contact.

Another time the chief operator reported cross ringing. After straightening the converter up, we placed it back in to service. A couple of days later the trouble was again reported. The cross ringing was more pronounced, accompanied by heavy sparking. While testing with a lamp, we heard a peculiar noise coming from the transformers. The trouble was located in the transformer of the frequency. We cut this frequency out and put the others in good shape and they rang all right. After removing the frame and core, the tape was taken off and the trouble was located. The insulation was burned, shorting several turns. Fortune was with us for the burn was only on the outside turns. After repairing the damaged turns, we began to replace the laminated core. One can appreciate this job after he has done it. The transformer was soon working and since we have had no more trouble with it.

A bad transformer was the means of my introduction to an exchange in which I was afterwards employed. Some years ago a severe sleet and wind storm broke down several miles of pole line, carrying with it the power lines. An operator was ringing on a line when it swung into lighting circuit and the telephone line carried the high voltage current back into the transformer of the converter. Soon it was noticed the transformer gave trouble on one letter. I was called very early in the morning and asked to bring a transformer from an extra converter which we had. I had a mile to walk to the exchange and then an eight-mile ride on the first local out on a cold winter morning.

Not long ago as I entered the wire chief's room I noticed the whir of the machinery was not in harmony with its usual sound. The converters seemed to be running away until an operator would ring when the speed would suddenly slow down as long as the button was depressed. Slipping my coat off in a hurry, I hastened to switch on the emergency converter and found it acted the same way. Both acting the same way indicated that the trouble was with the battery leads and not with the converter.

The converters work off a small 22-volt storage battery which is charged from the main battery through some lamps. Looking over the connections it was found that the acid had gotten under the insulation and eaten through one of the leads from the small storage battery. As the storage battery was not in multiple with the converter, the voltage across the vibrator was



Connection of Storage Batteries and Converter.

increased, causing it to speed up. As soon as a ringing button was depressed, more current was required causing its voltage to drop and consequently the speed to lessen.

Nottingham, Ohio. J. W. Hepner.

BROOKFIELD

means

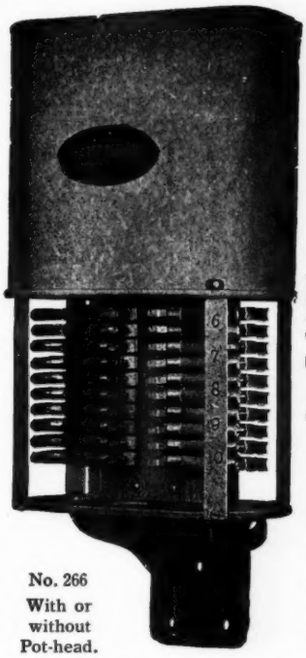
INSULATOR EFFICIENCY

This name is back of more than Two Hundred types of High and Low voltage Insulators.

It is a guarantee of Insulator quality —Service and Fair Prices.

Brookfield Insulators have been Standard for HALF A CENTURY.

Brookfield Glass Co.
2 Rector St. New York
Your dealer can always furnish Brookfield Insulators



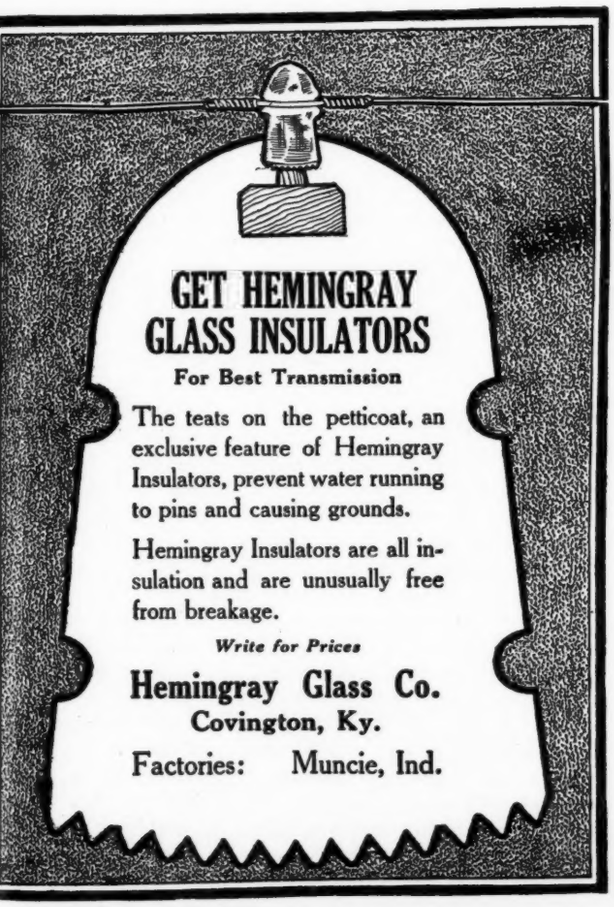
No. 266
With or without Pot-head.

PROTECT your Telephone System
with our "Sterling" protectors.
Everybody's Doing It.

No. 266 Can Top Terminal
is an extremely accessible arrangement.
Furnished with 3½ inch fuses, with or without carbon arresters; in sizes from 10 to 60 pairs.

Prices right. Bulletin No. 3 upon request.

LaFayette Electric & Mfg. Co.
LaFayette, Indiana



GET HEMINGRAY GLASS INSULATORS
For Best Transmission

The teats on the petticoat, an exclusive feature of Hemingray Insulators, prevent water running to pins and causing grounds.

Hemingray Insulators are all insulation and are unusually free from breakage.

Write for Prices

Hemingray Glass Co.
Covington, Ky.
Factories: Muncie, Ind.

We Pay Your Repair Bills

Rather a startling statement, isn't it?

Let us tell you about it.

We have such positive knowledge that Chicago Telephones are trouble proof that we bind ourselves legally to pay all repair expense. We pay not only for materials required, but also for the time and expenses of your trouble man while he is going to and from the telephone, and while he is making the repair.

If the telephone is ten miles from your Exchange this expense item might be greater than the price of the telephone. We can afford to do this because the percentage of Chicago Telephones that ever need attention is negligible. During the year ending July 1, 1912, with six hundred thousand telephones in use, this trouble insurance cost us only $274.00.

No other telephone factory dares to duplicate this repair service because no other telephone is good enough to justify it.

Write for booklet entitled "Making Good."

Chicago Telephone Supply Co.
Makers of Telephones and Switchboards
Elkhart, Indiana, U.S.A.

COMMISSIONS, COURTS AND COUNCILS.

(*Continued from page* 608.)

of Albany are to be combined and where the Home and the Bell telephones are now used because only one instrument will be used after May 1, 1913. It was also announced that in carrying out the combination of the Bell and Home companies, a new telephone building will be erected in Albany.

Frank N. Bethel, vice-president of the New York Bell, offered as a settlement of the case a sweeping reduction of the rates now in effect, the new rates, if accepted, to be charged after November 1 of this year. The company's offer was to reduce from $90 a year to $72 its charges for direct line business service, from $66 to $60 for two-party line business service, from $48 to $42 for direct line residence service, from $36 to $30 for two-party line residence service, and continue the present $24 rate for four-party line service.

In connection with this proposal Mr. Bethel asked that if the proposition were accepted, the whole matter of Albany telephone rates be put over until May, next, when the actual physical consolidation of plants will occur, the case to remain in such shape that if complainants at that time desire to test the reasonableness of the rates he proposed to put in effect next month, that right would be reserved to them.

In explaining the company's proposal Mr. Bethel said that the present Albany rates were not on an equitable basis in that the investment in Albany is not the investment on which the company desires to earn returns. He claimed that both the plants of the New York and the Home telephone companies are inadequate for the business they have to handle and that material changes would have to be made in the companies' equipment after the unification of the two systems. These alterations will require the selling of the Chapel street office and the erection by the company of a new building with sufficient equipment to not only handle the present traffic, but large enough to serve subscribers when all party lines are eliminated.

Arthur L. Andrews, who appeared for the Chamber of Commerce, stated that he was unable to reach a sufficient number of members of that body to ascertain its position on the proposed rate reductions. He asked that a short adjournment be had in order that a meeting of the Chamber of Commerce might be held to ascertain that body's attitude on the proposition.

William A. Choate contended that there was no reason why the company should not put in rates as low as those effective in Troy, Schenectady and other cities of the size of Albany.

For the Press Company Attorney Lynn J. Arnold agreed with General Parker's request for a longer adjournment, but stated that he could see no reason why the company could not establish equally as low rates in Albany as it charged in cities of a like population.

A recess was taken by the commission during which those present held a conference. It was then decided that the matter be held in abeyance until Monday, October 21. At that date representatives of the complainants will state whether or not they are willing to accede to the request of the company for six months' adjournment. If not, the case will be taken up again by the commission at Albany on October 28.

Public Service Commission Laws Analyzed.

New York public service commissioners are the best paid in the country; they receive $15,000 per year each. South Dakota commissioners receive least of all, their salaries being $1,500 a year. Members of the other 45 state commissions and one federal commission receive between $1,900 and $10,000 per year. These commissions have in the aggregate no less than 156 members.

This and other information regarding the organization of commissions is contained in a pamphlet recently issued for confidential circulation by the department on regulation o interstate and municipal utilities of the National Civic Federa tion, of which Emerson McMillin is chairman. It is part o the compilation and analysis of public utility regulation law which is being prepared in connection with the investigato of public utility regulation in this country. The compilatio of the laws is expected to be published about the first of th year as a part of the report of the department on its invest gation.

The membership of all the commissions with the exceptio of five is three. The interstate commerce commission ha seven members and the California, Georgia and two New Yor commissions have five members each. In the case of 26 o the commissions the members are appointed. Of the remain ing 23 they are elected. The terms of office range from tw to seven years. The members of 28 of the commissions hol office for six years; of three for five years; of six for fou years; of seven for three years; and of three for two years The membes of the Interstate Commerce Commission hol office for seven years.

Stringent rules govern the relation with public utilities o the members and employes of commissions. In many case the holding of an interest in any such utility is a disqualifica tion for membership.

In twenty-eight jurisdictions no member, officer or employ of the commission is allowed to engage in any other busines employment or vocation, or hold any other political offic The statutes sometimes provide that members shall devo all of their time to the duties of their office and in other case that they shall devote as much time as may be necessar Several of the states provide for the assessment of the cos of conducting the commissions to the utilities which are unde the jurisdiction of the commissions. This is usually don on a gross earnings basis.

The director of the investigation. John H. Gray, says: "I this part of our compilation we have gathered together all o the material found in the statute books relating to the organ ization and constitution of central commissions. This leg islation is voluminous and its condensation and analysis ha entailed a large amount of time and painstaking effort. I has been distributed to friends of the department and othe interested persons, subject to final revision at a later date We expect the compilation and analysis of public utility regu lation laws to be extremely valuable to all who may be in terested in the regulation by state authority of public utili ties in any part of the country. It will be especially valuable t members of legislatures."

Oklahoma Commission Affairs.

The Corporation Oklahoma Commission has deferred fina action on the complaint of F. E. Clayton, of Chicasha, against the Pioneer Telephone Co., alleging discrimination in rates in view of the discovery that the discrimination complained of, grew out of the application of zone rates. The whole question involved in the use of the zone system is to be threshed out by the commission at a later date in connection with another case.

In the testimony of the complainant in the Clayton case taken some time ago, it was contended that one subscriber paid more for his telephone than his neighbor in an adjoining block, although there was only a very slight difference in the distance from the exchange. The difference was explained by the company as being a result of the zone rate.

James L. Allen, a Muskogee attorney, has complained to the commission in regard to the service given by the Pioneer company at Muskogee. He alleges that the company does not employ sufficient or competent help and that he has at times had to wait twenty minutes before he could get the central operator. He makes other charges of poor service and asks the commission to go to Muskogee for an investigation.

FIBRE

DIAMOND STATE FIBRE COMPANY

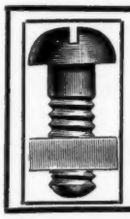
General Offices ELSMERE, DEL. Chicago Branch 714 West Van Buren St.

In sheets, rods and tubes. Special shapes to order. Specialties used by manufacturers of telephone equipment furnished.

DISFICO HORN INSULATION

the newest and best insulation for armature work. *Absolutely free from acid, etc.*

Sample on application.



BOLTS

Of every description for telephone construction. Besides we make screws, nuts and pole line hardware. Hot or cold galvanizing. Prompt shipments. Write mentioning *TELEPHONY.*

ROCKFORD BOLT CO., 20 RUBY STREET ROCKFORD, ILL.

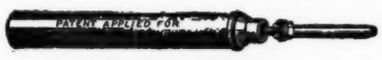
GLOVES Made of Rubber That Wears

Flexible, Seamless and Safe

Tested to 4,000 to 10,000 volts before leaving our factory.

The Canton Rubber Co.
Canton, Ohio

POT END HEAD



Requires no Wiping

H. E. ADAMS MFG. CO.
341 4th Avenue PITTSBURGH, PA.

ADAMS
Bonding Clamps
Cable Tap
Good Luck
Terminal
Cable Hangers

EVERSTICK ANCHORS

Anchor Closed

Anchor Expanded

Have the greatest holding power. More "Eversticks" used than all other patented anchors. *There's a reason.* Write for literature.

Everstick Anchor Co.
ST. LOUIS, MO.

COMMONWEALTH HOTEL

INC.

Opposite State House,

BOSTON, MASS.

Offers rooms with hot and cold water for **$1.00** per day and up, which includes free use of public shower baths.

Nothing to Equal This in New England

Rooms with private baths for **$1.50** per day and up; suites of two rooms and bath for **$4.00** per day and up.

Dining Room and Cafe First Class. European Plan.

ABSOLUTELY FIREPROOF

Stone floors; nothing wood but the doors.
Equipped with its own Sanitary Vacuum Cleaning Plant.

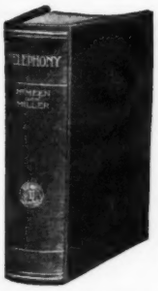
Strictly a Temperance Hotel ***Send for Booklet***

STORER F. CRAFTS, General Manager

THE LATEST AND BEST

TELEPHONE BOOKS

Telephony Publishing Company, Monadnock Block, Chicago



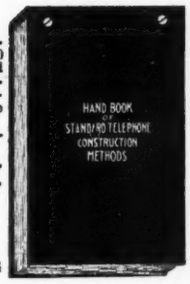
TELEPHONY

By Kempster B. Miller, M. E., and Samuel G. McMeen.

Consulting Electrical Engineers and Telephone Experts. Over 960 pp., 671 illus. Price, $4.00. A complete working guide to modern telephone practice, including substation equipment, instruments, lines, circuits, sets, exchanges, party-line systems, protection, manual switchboards, automatic systems, power plants and buildings, special-service features, private branch exchanges, common-battery systems, intercommunicating systems, measured service, traffic, telegraph and railway work, pole-line and underground-cable construction, engineering, operation, maintenance depreciation, development studies, testing, etc.

Hall's Hand-Book of Standard Telephone Construction Methods

By Frank B. Hall



The Most Practical and Most Helpful of all Telephone Books. Over 280 pages of specifications; 250 pages of illustrations. Pocket size, loose leaf, bound in black leather. Price, $4.00; postage prepaid. CONTENTS: Specifications Exchange Aerial Construction. Class "A," "B" and "C" Standard Pole Lines, 22 Sections.

Specifications Exchange Underground Construction—12 Sections.

Specifications Toll Line Construction—Class "D", and "E" Standard Pole Lines, 12 Sections.

Specifications Toll Line Construction—Class "F" Standard Pole Line, 5 Sections.

Specifications Sub-Station Wiring—2 Sections.

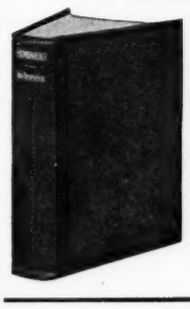
Material Specifications—6 Sections.

Material Catalog—25 Pages.

Material Drawings—39 Pages.

Full Page Figures Showing Standard Methods—214 Pages.

Telephonology *By H. R. Vandeventer*



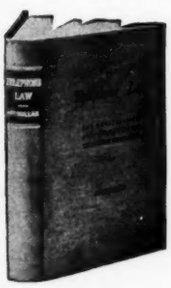
This book is written so as to be easily understood. It appeals to the workman as well as to the trained engineer. Contains 600 pages (6x9), and over 600 illustrations. Price, $4.00 net, postpaid. No obsolete or historical matter. Every description practical and covering the latest type of equipment. Labor-saving stunts that have proven successful with others are given.

CONTENTS: I.—First Principles, Talking Equipment. II.—Signaling Equipment. III.—Commercial Talking Equipment. IV.— Magneto Instruments and Circuits. V.—Magneto Switchboards. VI.—Selective and Lock Out Systems. VII.—Batteries. VIII.—Testing Telephone Parts. IX.—Testing Equipment and Faulty Location. X.—Measuring Instruments and Their Uses. XI.—Common Battery Equipment. XII.—Harmonic Party Line Systems. XIII.—Line and Cable Construction. XIV.—The Automatic System. XV.—Composite Systems. XVI.—Wireless Telephony.

The A. B. C. of the Telephone

J. E. Homan, A. M.

A concise and useful treatise covering all phases of telephone work. Shows development of the telephone industry from its beginning up to the present time. Gives a description of its valuable inventions, appliances and methods. Contains 375 pages and 268 illustrations and diagrams. Handsomely bound in black vellum cloth. Price, $1.00, postpaid.



Telephone Law

By A. H. McMillan, A. D. LL. D.

Over 300 pages (6 x 9). Price, $3.00. This book does not contain legal expressions which can not be understood by any one seeking information. Its function is to solve legal questions in the most simple manner. It should be the property of every Telephone man.

Valuation of Public Utility Properties

By Henry Floy, Consulting Engineer

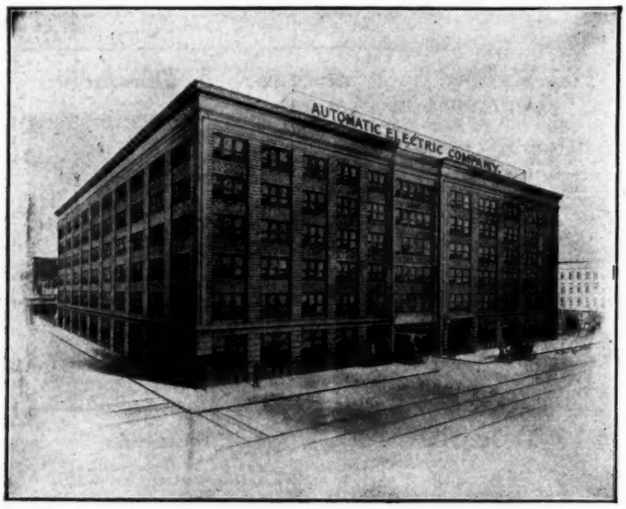
Contains 402 pages (6 x 9), with tables and diagrams. $5.00 (21s) net postpaid. A book of facts—not general statements. The appraisals of public utility properties is a live subject today. CHAPTER HEADINGS: I.—Introduction. II.—Glossary. III.—Public Service Commissions. IV.—Making an Appraisal. V.—Structural Costs. VI.—Development Expenses, Intangible Expenses, Non-physical Costs, Overhead Charges. VII.—Franchises, Good Will, Going Value. Contracts. VIII.—Depreciation. IX.—Appraisals of Public Utility Properties in Greater New York. X.—Important Appraisals Elsewhere.

From Factory and Salesroom

Convention: Texas Independent Telephone Association, Dallas, October 25

Automatic Supply Department Completes Second Year.

The Supply Sales Department of the Automatic Electric Co., of Chicago, passes its second milestone this week and Elsworth Keith, manager of that department is to be congratulated upon the success which his organization has achieved. Mr. Keith is a thorough telephone man by training and hereditary influence, his father being A. E. Keith, the chief engineer for the Automatic Electric Co. and one of the best known men in the telephone field.



The Factory of the Automatic Electric Co.

Elsworth Keith prior to organizing the supply sales department, spent considerable time in the various departments of the Automatic Electric Company's factory, in acquiring a complete knowledge of manufacturing practice.

The growth of the supply sales department being so phenomenal that it has aroused comment, Mr. Keith's expression will probably be interesting. It follows in part:

"The growth of the supply sales department of the Automatic Co. has not been attained at the expense of thoroughness and permanence. It is the result of a genuine demand for development in telephone supplies and the fulfilling of this demand satisfactorily.

We have not been handicapped by lack of facilities. We can adopt immediately the newest and best appliances for effecting improvements of economies and thus can lower the manufacturing cost of our products. We never wait until our machinery is worn out, if we see a chance to better our output by securing new appliances.

We have an expert engineering staff and sales force enjoying practical telephone experience as well as a big factory where efficiency makes manufacturing costs low and excellent construction sure."

In his choice of selling agents, Mr. Keith has been unusually fortunate, selecting live, experienced concerns and men to push the Automatic Electric Company's supplies. In the Southwest, the Wesco Supply Co., at St. Louis, Mo., represents the supply department's interests, while in the East, it has Seymour Hirsch at Toledo, Ohio, and J. P. Roger, at 32 Union Square, New York City.

The unique trade mark of the concern is fast identifying "Raven Brand" supplies to all telephone buyers. The line of Raven Brand products embraces cable, monitor sets, interior wire receivers, enameled wire, transmitters, telephone cords, switchboard cords, condensers, indestructible mouthpieces and all forms of telephone supplies. To make the line fully complete the engineering staff of the Automatic Electric Co. and the supply sales department working under the direction of John H. Finley and other prominent railroad telephone men has developed a complete line of railway telephone equipment and supplies.

Last year the business was three times that of the first year, despite the fact that the business for the first year placed the supply sales department in the same class with many prominent manufacturing concerns. Mr. Keith says that the company has many improvements in mind which are sure to add many more names to its list of customers and intrench the concern still firmer with the Independent telephone field. TELEPHONY hopes that the supply sales department will have many happy returns of the day.

The Johns-Manville at Railway Electrical Convention.

The H. W. Johns-Manville Co., of New York, will have an unusually interesting exhibit this year at the fifth annual convention of the Association of Railway Electrical Engineers to be held at the Auditorium Hotel, Chicago, October 21 to 25.

There will be shown a complete line of J-M fibre conduit with fittings. This conduit is well known and widely used on account of its strength and light weight, and is said to be free from electroysis.

The latest developments in "Noark" protective devices will be shown. These operate as their name implies, with "no arc" or flash; they are noiseless, inexpensive and occupy minimum space. There will also be shown J-M ebony asbestos wood for power switchboards, and a full display of overhead line material, with special attention to molded insulation such as molded mica, electrobestos and vulcabeston.

The Audiffren-Singrun refrigerating machine will undoubtedly attract much attention. This is a small, efficient and particularly simple refrigerating and ice making machine for use in residences, hospitals, clubs, etc. It is operated by ½ to 4 H. P. motor, depending upon the cooling or ice making capacity. This refrigerating machine will be mounted with the refrigerating element running in the air so as to clearly illustrate the operation of the device.

The company will be represented by H. M. Frantz, manager of the electrical department in the Chicago branch; H. W. Frantz of the Chicago branch; J. C. Younglove, assistant manager railroad department, Chicago branch; and Geo. A. Saylor, manager electrical department, Milwaukee branch.

The Value of Telephone Pay Station Signs.

Last summer a stranger stepped from a train as it stopped in a small town located on one of a chain of inland lakes in Michigan. It was his intention to travel via boat along a route famed for its scenery. He found his way to the dock and then discovered that he had been misinformed regarding the schedule of the boat, as it did not start on the trip until the next day. There was nothing of interest in the town to tempt him to remain there long, so he bethought himself of some friends at a lake resort but a short distance away.

He knew that they had planned to leave that morning for another resort which was located near the town in

CEDAR
NORTHERN POLES WESTERN

We are pioneers in the butt-treatment of poles using Creosote Wood Preserver. Telephone us.

THE VALENTINE-CLARK COMPANY
MINNEAPOLIS, MINN.
Western Sales Office: St. Maries, Idaho

NAUGLE
Pole & Tie Co.
5 South Wabash Ave.
Chicago, Illinois

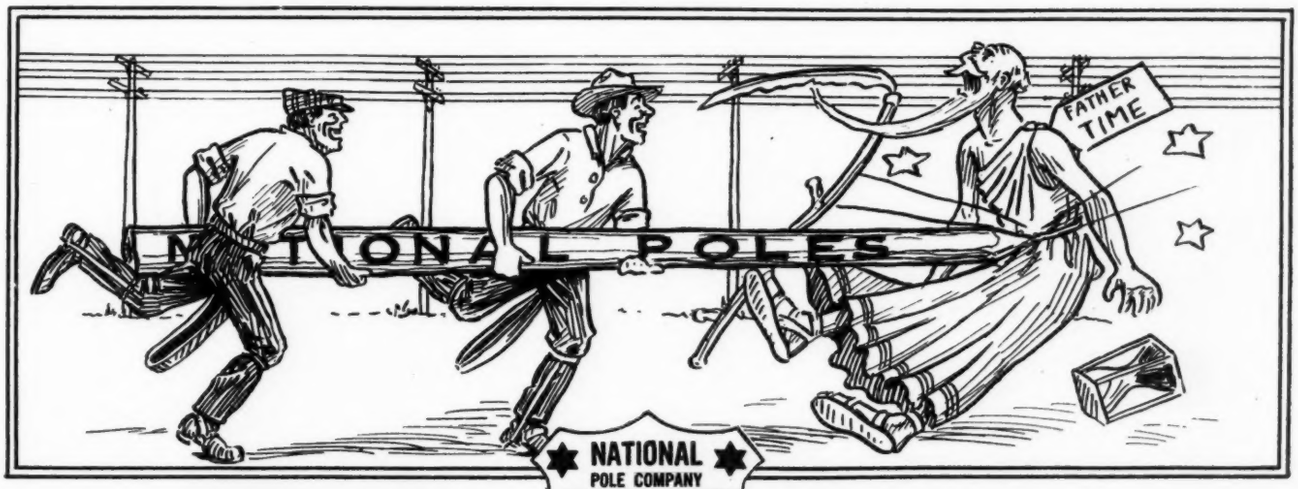
The Trinity in Poles
"Service—
Price—
Quality."

POLES

Cedar

Crawford Poles
are all satisfactory in life, strength and appearance. Price is O. K. Write
Crawford Cedar Co.
Menominee, Mich.

Poles



"FROM THE STUMP TO THE LINE"

NATIONAL POLE COMPANY
ESCANABA, MICH.
CEDAR POLES

Very Few Systems Employ Flimsy Construction any more. The Better the Company, the Better Its Methods. We are Able to Fill the Most Exacting Requirements of the Very Best Companies.

Over fifteen years of experience in WHITE and WESTERN CEDAR POLES
Exceptional Facilities. Yards at the Most Favorable Shipping Points.

National Pole Co., Escanaba, Mich.

which he then was. By quick action over the telephone he thought he could intercept them before they started and thus arrange for a meeting. Hastening up the street in search of a telephone, he came to the general store and was greatly relieved to see a sign hung out in front, announcing a "long distance" telephone station. Entering

One Design of a Pay Station Sign.

the store he quickly secured the desired telephone connection and made an appointment to meet his friends and later spent a most delightful afternoon and evening with them.

This story shows the availability of the telephone even in the very small towns. It also indicates the use of a sign in directing a stranger to the telephone. The incident occurred in a small town and at the time there was no one in sight from whom information could have been secured. The sign quickly indicated to the stranger where he could obtain the service he wished, without delaying to ask questions.

So in other cases, the value of signs indicating the availability of telephone has been demonstrated. In large cities one will notice signs informing the public of telephone pay stations for local and long distance service, projecting from doorways of stores, in hotel lobbies and even in the waiting rooms of the elevated railroad stations. The reason for this is that the telephone companies are alive to the possibility of suggestion and know that a sign prominently displayed furnishes the suggestion for telephoning regarding various matters.

Frequently in smaller towns the accessibility of the telephone is not brought to the attention of the public and the stranger often has difficulty in finding a telephone to use.

Telephone signs of various designs and sizes are on the market. The one shown in the illustration is made of No. 18 gauge steel with the design in porcelain enamel which is made by firing and fusing vitreous enamel into the steel under 1,800 degrees in a blast furnace. It is said that the colors on these signs are permanent and do not fade out nor do the signs rust.

The Enamel Steel Sign Co., Chicago, manufactures signs of all kinds for telephone use and will be glad to correspond with telephone companies desiring information regarding them.

Asks Increased Rates at Bay City.

The Valley Home Telephone Co. has petitioned the city council of Bay City, Mich., for permission to slightly increase its rates in that city. The company is prepared to expend a considerable sum in betterments and extensions.

Paragraphs.

THE CENTURY TELEPHONE CONSTRUCTION CO., of Buffalo, N. Y., has received an order from the Phelps Mutual Telephone Co., of Phelps, N. Y., for its complete central office equipment. The switchboard is a combination common battery and magneto system. The common battery system is arranged for four-party harmonic selective for city service, and the magneto feature will be applicable for the toll line and rural service, with suitable arrangements provided for interconnecting of the common battery village telephone to the rural magneto telephone and vice versa.

The switchboard is the 13 unit type cabinet with an immediate installation of 100 common battery and 20 magneto lines; 10 pairs, local to local, five pairs, local to magneto, and five pairs magneto to magneto cords, together with the usual operator's, night alarm and pilot equipment.

The Century company will also furnish and install the power boards, relay racks, protection frames, storage batteries, charging and ringing machines with duplicate vibrators.

G. W. SCHUEPPERT, until recently with the Oshkosh (Wis.) Mfg. Co., and who has many friends in Chicago, is now secretary, treasurer and manager of the Merrill (Wis.) Iron Works.

THE L. B. ALLEN CO., INC., of Chicago issues attractive monthly wall calendars, by means of which attention is directed to the Allen sodering products. The October issue brings to mind the horse show season, as it carries a handsome three-color reproduction of a picture entitled "Four in Hand." A coupon post card is attached to the calendar. It contains a request for the calendars as issued and also for samples of Allen fluxes and soders.

A. J. KOHN, sales manager for Cracraft, Leich Electric Co., Genoa, Ill., after graduating from the electrical engineering course of the University of Wisconsin, obtained his first telephone experience in the factory of the Stromberg-Carlson Telephone Mfg. Co.

After six months in its switchboard and telephone assembling departments, he was transferred to the circuit division of the engineering department, of which he had charge for four years, together with the electrical and experimental laboratories. While in these departments, he was responsible for the design of the majority of circuits used in some of the largest Independent exchanges in the country, contributing considerably to the refinements now existing in multiple exchange practice.

In 1910 he was transferred to the sales engineering department of the Stromberg company handling exchange equipment,

A. J. Kohn.

contract and specification work exclusively; also having charge of the company's special lines, such as railway signaling equipment and government contracts.

While in this department, he developed a line of hospital signaling systems which are now being universally installed in the largest hospitals throughout the country.

WHITE CEDAR POLES

We handle just the poles for your purposes—the kind that you can depend upon to give service.

We are producers of poles—not jobbers. Consequently reasonable prices.

Let us quote you on your next order.

KAYE & CARTER, 1043 Lumber Exchange Bldg., Minneapolis, Minn.

IDAHO AND NORTHERN
CEDAR POLES
WE ARE PRODUCERS

Yards in IDAHO, MICHIGAN, CANADA.
Toledo Yard for Urgent Orders. : : Get our Prices.
Ask for Leaflet No. Six

THE F. BISSELL COMPANY, TOLEDO, OHIO

PRODUCERS OF QUALITY CEDAR POLES

WE PRODUCE OUR STOCK THEREBY GIVING YOU THE BEST THAT GROWS

GIVE US A TRIAL ORDER.

TRI-STATE CEDAR CO.
COEUR-D'ALENE, IDAHO

They last longer in any soil—Stand twice the breaking strain of others.

CHESTNUT POLES

LARGE STOCKS
LOW PRICES
QUICK SHIPMENTS

Write to-day to PADUCAH POLE & TIMBER CO.,
Paducah, Kentucky

CEDAR POLES

We have a fine lot of poles.
Our poles are strong and tough—the kind you need for long service.
LET US SEND QUOTATIONS TODAY

PERLEY LOWE & COMPANY
1458 McCormick Bldg. :: CHICAGO

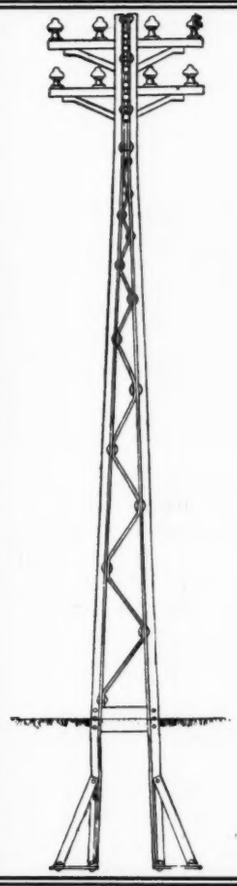
POLES OF
STERLING QUALITY

Oldest Cedar Pole Firm in Business — Producers for 32 Years

MICHIGAN WHITE CEDAR
W. C. STERLING & SON COMPANY
1880 MONROE, MICHIGAN 1912

White Cedar Poles

C. H. WORCESTER CO.
CHICAGO



Before You Buy Another Pole — Learn About Carbo Steel Poles

Many tests have proven that they are easily best for telephone use. Carbo Steel Poles are cheaper than wooden poles in first cost, their maintenance is about one per cent a year. Compare this with wood at 7½ per cent. They last fifty years and still have a good scrap value; treated wood lasts but twenty years. Carbo Steel Poles stand the most severe strains of wind, ice and heavy lines. They haven't the excessive weight and size that makes wooden poles subject to frequent failures.

Carbo Steel Poles are strong, light and inexpensive. It is worth a lot to you to learn about them now.

CARBO STEEL POST CO.
Chicago Heights, Ill.

H. P. HILL, 30 Church St., New York City
S. W. COREY, Delta Bldg., Los Angeles, Cal.

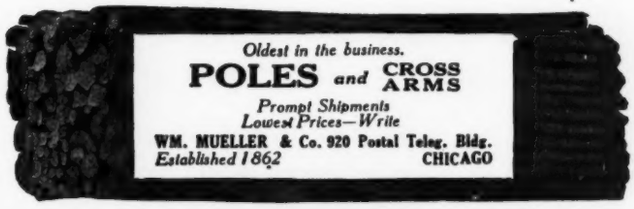
WRITE US—WE MAKE LOW PRICES—SHIP GOOD STOCK
Idaho Red Cedar Poles

30 CEDAR YARDS IN IDAHO, WASH. AND B.C.

WESTERN LUMBER & POLE CO.
Main Office: "Electric" Bldg., Denver, Colo.

Idaho Cedar Poles
Northern Mercantile Co. Ltd.

Resident Producers
Sand Point, Idaho

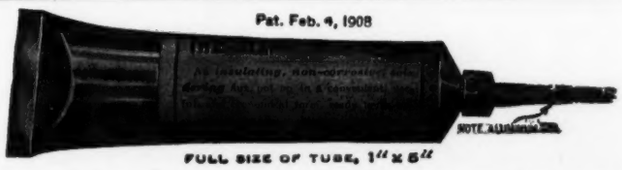


Oldest in the business.
POLES and CROSS ARMS
Prompt Shipments
Lowest Prices—Write
WM. MUELLER & Co. 920 Postal Teleg. Bldg.
Established 1862 CHICAGO

Insulated Staples
5 Sizes
Pat. Nov., 1900

BLAKE Specialties

STAPLES best for wiring.
TUBE FLUX best Flux for soldering.



Pat. Feb. 4, 1908

FULL SIZE OF TUBE, 1" x 8"

BLAKE SIGNAL & MFG., CO. Write for Samples 246 Summer St., Boston, Mass.

Legal Cases and Decisions

By A. H. McMillan

Height of Poles in Minnesota.

"Our country lines are poled with 20 ft. poles and 25 ft. over the road crossings. This country is all prairie and along some of the roads there is no ditch. Threshing rigs cut into the fields anywhere, and unless the wires are lifted over their weighers, they catch, breaking the wires and sometimes breaking the poles also.

Are there any requirements in Minnesota as to the height of the wires over roads and also along the fields? How would you suggest a good way to make an example of some of these fellows?"

Wires must always be high enough over roads and along the fields so as not to interfere with public travel thereon. The use of the roads by a threshing rig in the country would undoubtedly be considered one of the uses for which such road was intended. This applies to road crossings.

Along the fields there would be no need of having the poles of extraordinary height except over lanes or driveways into the field. In other places the drivers of threshing rigs would be under obligation to lift the wires instead of breaking them down. A good way to make an example in the latter instance would be to sue for damages.

Repeating Messages from Bell to Independent Telephone.

"Will you kindly advise me through the columns of TELEPHONY as to whether in your opinion a subscriber having both Bell and Independent stations in his residence, would be violating his contract in any manner with the Bell people, provided he used the Bell instrument partly or in whole, for the purpose of repeating messages from the Independent to the Bell subscribers without the medium of a switch. The Bell people maintain that this is detrimental to their business and they are in a measure giving the Independent what they require without compensation. Further, if this was found to be a violation of the Bell contract, what redress, in your opinion, would they have through the Ontario courts? Could they legally remove the Bell instrument and cancel contract?"

The answer to this query depends entirely upon the wording of the contract between the Bell company and its subscriber. Unless it was specially provided in the contract that the subscriber should not use it for the purpose of repeating messages in the manner mentioned, we think it would not be unlawful. If it was found to be in violation of the Bell contract, the company could sue for damages or remove the Bell instrument and cancel the contract, provided such removal and cancellation was provided for in the contract.

Injury to Brakeman on Freight Car.

While standing on the top of a box car in the discharge of his duty, a brakeman was struck by a telephone wire suspended across the track and injured. The wire over the track did not belong to the telephone company but to the subscriber whose home was connected with its exchange. The company contended that it was not liable because it did not own the wire. The plaintiff insisted that the company was liable because it placed the wire in position and afterwards used it.

The evidence did not show whether the railroad company authorized the wire to be suspended over its track or not.

The court held that if the railroad company authorized the crossing, the telephone company had a right to assume that the railroad company would see to it that its trains were operated with reference thereto, and would take such precautions as might be necessary to protect its employes from injury by coming in contact with it. If the railway company, having authorized the placing of the wire where it was, failed to use such care as it should have used in the discharge of its duty to furnish the brakeman a safe place to work, the railway company would be liable. Hence, a judgment against the telephone company was reversed. Southwestern Telegraph & Telephone Co. vs. Corbitt, 148 Southwestern, 826.

Joint Use of Poles.

The laws of Pennsylvania (1903) provide that it shall be lawful for corporations using electrical current within the state, to make contracts with each other for the use of the same poles, wires, conduits or for the purchase and sale of electric current, or for the lease and operation of each other's systems, on such terms as are agreed upon providing that nothing in the law shall be construed to give a company any rights in any street or road not already so occupied, unless the consent of the local authorities shall have been first obtained.

An electric railway company strung its wires upon the poles of an electric light company within the limits of a borough under a contract with the latter company, although its wires were located on streets occupied by the light company, which were not part of the railway. The borough commenced an action to restrain the maintenance of the wires in the way stated. The suit was dismissed because the court found that the interference with public travel would be the same, whether the line was strung on the poles of the railway company, following its line of track, or on the poles of the light, heat and power company. Borough of Houston vs. Washington & C. Railway Co., 83 Atlantic, 108.

Bids Over the Wire.

"C" recovered judgment against "V" and his attorney directed a levy on certain real estate, which the sheriff proceeded to sell without notice to "V." On the day of the sale the deputy sheriff telephoned the attorney that he could find no bidders and asked for instructions. The attorney, after consulting with his wife, who was secretary of "V," which was a corporation, telephoned the deputy to bid $100 and not over that amount on behalf of the "V" corporation.

The attorney was not present at the sale and did not know who was there. It was contended that the bid was not a valid one and should not have been received. The court held, however, that there was no impropriety in the receiving of the bid over the telephone, provided he made a public outcry thereof at the place of the sale before striking off the property. It was also held that the facts were insufficient to show collusion. Victor Inv. Co. vs. Roerig, 143 Pacific, 349.

Condensed News Reports

Officers of Companies are Earnestly Requested to Forward Us Promptly All Financial and Other Statements as Soon as Issued, and Any Items of Interest as to Their Plants and Systems

Personal.

O. A. KNELL, who has resigned his position as wire chief for the Tri-State Telephone & Telegraph Co., has been promoted to superintendent of maintenance and equipment for the same company. His headquarters are now in St. Paul.

F. L. GILMAN, general manager of the Missouri & Kansas Telephone Co., Hutchinson, Kans., has resigned to accept a position with the Western Electric Co. Mr. Gilman will have charge of several of the company's largest shops at Hawthorne, near Chicago.

E. P. INGRAM, who has been district manager for the Southwestern Telegraph & Telephone Co. at Pine Bluff, Ark., for several years, has been transferred to Little Rock. There he will have charge of all the local business. He is succeeded by W. L. Jones.

C. A. SPAULDING has been named to succeed W. J. Hiss, at

Idaho Red Cedar **Poles**

Sandpoint Lumber & Pole Co., Ltd.

SANDPOINT, IDAHO.

Large Stocks—Prompt Shipments
Good Quality—Right Prices

CEDAR POLES Shipped Quick

Our Minnesota Transfer yards in the center of the Twin Cities are maintained expressly for quick shipping service. Complete stock and plenty of cars at your service. Send for quotations.

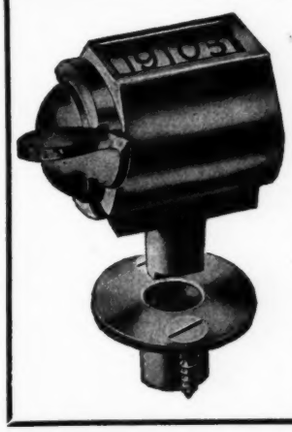
PAGE & HILL, Lumber Exchange MINNEAPOLIS

The SUPERIOR Solderless Ground Rod

THIS rod has a self-contained wire connector. Insert the ground wire and drive the key—that's all. Makes a *quicker* and *better* connection than the average soldered joint. Write for particulars.

For Sale by

Insulator Arrester Co.
Duluth, Minn.



Veeder Counters

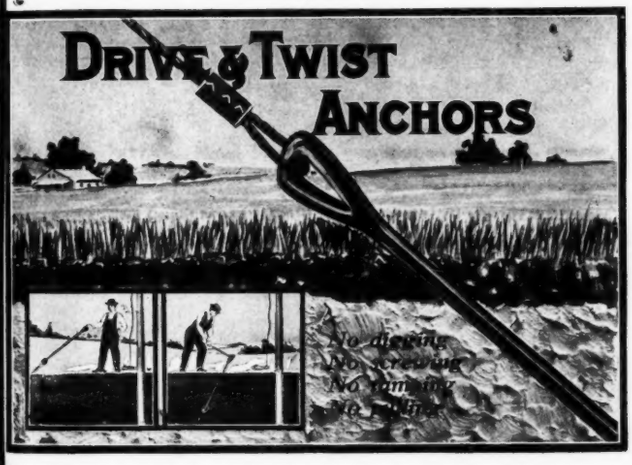
¶ When you desire to take the count of the calls the operator answers, a Veeder Counter is necessary.

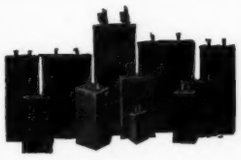
¶ Get a counter that can be depended upon at all times. You can make no mistake in selecting the Veeder.

¶ Write for catalogue which gives a complete description.

THE VEEDER MFG. CO.
11 Sargeant St. Hartford, Conn.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Fine Castings.





"MANSBRIDGE" TYPE, TELEPHONE CONDENSERS

embody all the essentials of long life and good service. *Write for Literature*

ELECTRIC SPECIALTY CO.
Cresco, Iowa

The Orr Pole Reinforcing Process

Restores the life of poles which are decayed at the ground line. The Orr Reinforcement can be inexpensively applied without interrupting service. Send today for our valuable book on Pole Reinforcing.

PITTSBURGH REINFORCING POLE CO.
435 Sixth Ave., - PITTSBURGH

HYDE'S TELEPHONE TROUBLES and HOW TO FIND THEM

An up-to-date manual pertaining to Telephone Troubles and their remedies on both magneto and Common Battery Systems—also containes table of ***Cost Units*** for estimate work. The use of all technical terms has been avoided. No telephone man can well afford to be without this handy book—it costs but 25c.

For sale by

TELEPHONY PUBLISHING CO.
MONADNOCK BLOCK — CHICAGO

Here's a Proposition
We will ship twelve anchors subject to your approval. We guarantee them to hold more and cost you less installed than any other anchor made. State if you want them for light, medium or heavy guy work.
THE VOTE-BERGER CO.
1848 W. Avenue
LaCrosse, Wisconsin

present division general manager of the New York Telephone Co., who will leave Buffalo, N. Y., on November 1st to assume the general managership of the Bell Telephone Co. of Missouri, with headquarters at St. Louis.

WILL C. MOELLER, owner of the Doon Telephone Exchange, Doon, Iowa, has demonstrated satisfactorily that one does

On the Job. A New Device.

not need to be a college graduate in order to succeed in the telephone business. Mr. Moeller was born in Rock Island, Ill., May 29, 1875, and received his education in country schools of Iowa. He was a farmer by profession until the telephone business interested him. In the fall of 1905 he became the owner of the Rock Valley Telephone Exchange, continuing to operate it until June 1, 1906, when he bought the Doon plant. Mr. Moeller is a member of the M. W. A. and the M. B. A. One illustration shows him with all his trappings on, ready for the game. The other reproduces a device of his own invention, which he has patented.

H. P. CLAUSEN, for a number of years electrical engineer and general superintendent for the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., has resigned to associate himself with the Western Electric Co. Mr. Clausen will devote himself to development studies along various lines.

D. H. MORRIS of Dayton, Ohio, who has been connected with the engineering department of the Central Union Telephone Co., has been appointed district commercial manager of the Columbus district, with headquarters at Columbus. He succeeds J. F. Druckemiller, who has been made district commercial manager of the Chillicothe district, with headquarters at Columbus.

New Companies.

THAYER, IOWA.—A telephone company has been organized in Union and Clarke counties and the capital stock is $1,300. The officers of the company are Wiley Gripp, president; Oscar Gripp, secretary, and J. A. Jackson, treasurer, and John Laufer, Joseph McClure and C. W. Paterson, directors.

JACKSONVILLE, FLA.—The Home Telephone Co. has been incorporated, with $1,325,000 capital stock. It was recently granted a franchise here by popular vote.

VASSAR, MICH.—Initial steps have been taken to form an Independent telephone company. This will be known as the Vassar Telephone Co. and will be formed with a capital stock of $5,000.

BERKEY, OHIO.—The Berkey Farmers' Mutual Telephone Co. has been organized by R. Murbach and others.

ST. LAWRENCE, PA. Articles of incorporation have been filed for the St. Lawrence Rural Telephone Co. by Joseph Drass, Lewis Deitrick, Philip Gill and John C. Gill. Charles Warner has been elected treasurer.

MARTIN, TENN.—The Martin Rural Telephone Co. has been chartered by J. Y. Bowers, R. Bell, H. P. Bell, O. D. Collier and J. T. Parrish. The capital stock is $5,000.

WAUSAU, WIS.—The Farmers' Eastern Telephone Co. has been incorporated with $5,000 capital stock. The incorporators are W. W. Albers, V. Heinemann, J. Montgomery and E. B. Thayer.

Financial.

CAMBRIDGE, ILL.—The Citizens' Mutual Telephone Co. has increased its capital stock from $2,250 to $5,000.

TRAER, IA.—The Mutual Telephone Co. of Traer has decla a semi-annual dividend of 5 per cent on the common stock.

LINCOLN, NEB.—The Nebraska Railway Commission authorized the Hamilton County Farmers' Telephone A ciation to issue $1,000 additional stock for extensions.

CHIPPEWA FALLS, WIS.—The Chippewa Falls Telephone has amended its charter and increased the capital from $30 to $150,000.

Franchise.

LAKEPORT, CAL.—Application has been made by the L County Telephone Association for a franchise to constru telephone system in the town of Lakeport. Sealed bids be received up to November 4 for the sale of the franchis

ELKHART, IND.—The Board of Public Works has grante twenty-five year franchise to the Indiana Union Telephon Telegraph Co. to conduct a long distance telephone and te graph business.

GRUNDY CITY, IOWA.—The city council has approved a pro sition to grant a twenty-year franchise to the Local T phone Co.

LYMAN, WASH.—The Skagit River Telephone & Telegra Co. has been granted a franchise to operate here.

Elections.

POCAHONTAS, ARK.—The Farmers' Mutual Telephone has elected the following officers to serve ensuing year: W Rush, president, Ravenden Springs; Rufus Lacy, vice-pre dent, Foster; Joseph DeClerk, secretary, and L. C. Hay treasurer, both of Pocahontas.

CHERRY VALLEY, ILL.—The Farmers' Union Telephone held its annual meeting recently and elected the follow directors: C. C. Macguire, Charles Fox, Benjamin Knapp berg, A. C. Watson and Henry Aves.

LINCOLN, ILL.—At a meeting of the stockholders of Central Illinois Telephone & Telegraph Co., the follow directors were elected: F. W. Longan, W. K. Maxwell E. D. Blinn, Jr.

RUSHVILLE, ILL.—The stockholders of the Schuyler Te phone Co. have held their annual meeting and elected following directors: Perry Logsdon, James E. Peck, Geo W. Jones, J. W. Whitson, Horace B. Baxter, Enoch Edm ston, John W. Lambert, O. T. Lawler and C. L. DeWitt. directors elected the following officers: President, Enoch monston; vice-president, J. E. Peck; secretary, C. L. DeW treasurer, Perry Logsdon.

JEREMIAH, KY.—The Rockhouse Telephone Co. has elec J. M. Brown, general manager, and J. C. Ison secretary treasurer. The company will make some improvements to lines.

DUNDEE, N. Y.—The Barrington & Wayne Telephone recently held its annual meeting and elected the follow officers and directors: President, Benjamin Kenyon; vi president, Elmer Miles; secretary, Harry Dibble; treasur Martin Bellis; Arthur Bellis and William Crosby.

LAKE COMO, PA.—The Northern Wayne Telephone held its annual meeting and elected the following office President, W. J. Healy; vice-president, Fred Coddingto secretary, Patrick Gleason; treasurer, Michael Gell.

Miscellaneous.

MAMMOTH SPRINGS, ARK.—The Bell Telephone Co. has pu chased the telephone system of the Hynson Bros. Te phone Co.

ASHLAND, ILL.—The Ashland Telephone Co. has been so by Charles Brasell to J. A. Way, of Virginia. Mr. Bras will take charge of the telephone properties at Arenzville,

KAMRAR, IOWA.—The Kamrar Telephone Co. has been so to F. G. Snyder and A. B. Hall.

BREMEN, O.—The Bremen Telephone Co. has bought t business of the Central Union Telephone Co. at Bremen.

COLUMBUS, O.—The Manchester Telephone Co. has pu chased the Adams County Telephone Co.

Underground.

SANTA BARBARA, CAL.—The Pacific Telephone & Telegra Co. has started work removing its wires and placing them u derground. The work will cost approximately $20,000.

LUVERNE, MINN.—The Northwestern Telephone Co. is ma ing plans to improve its plant and will place its wires unde ground in certain sections of the town.

MILWAUKEE, WIS.—The Wisconsin Telephone Co. will pla more wires underground in this city.